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July 5, 1934

Engineering News-Record

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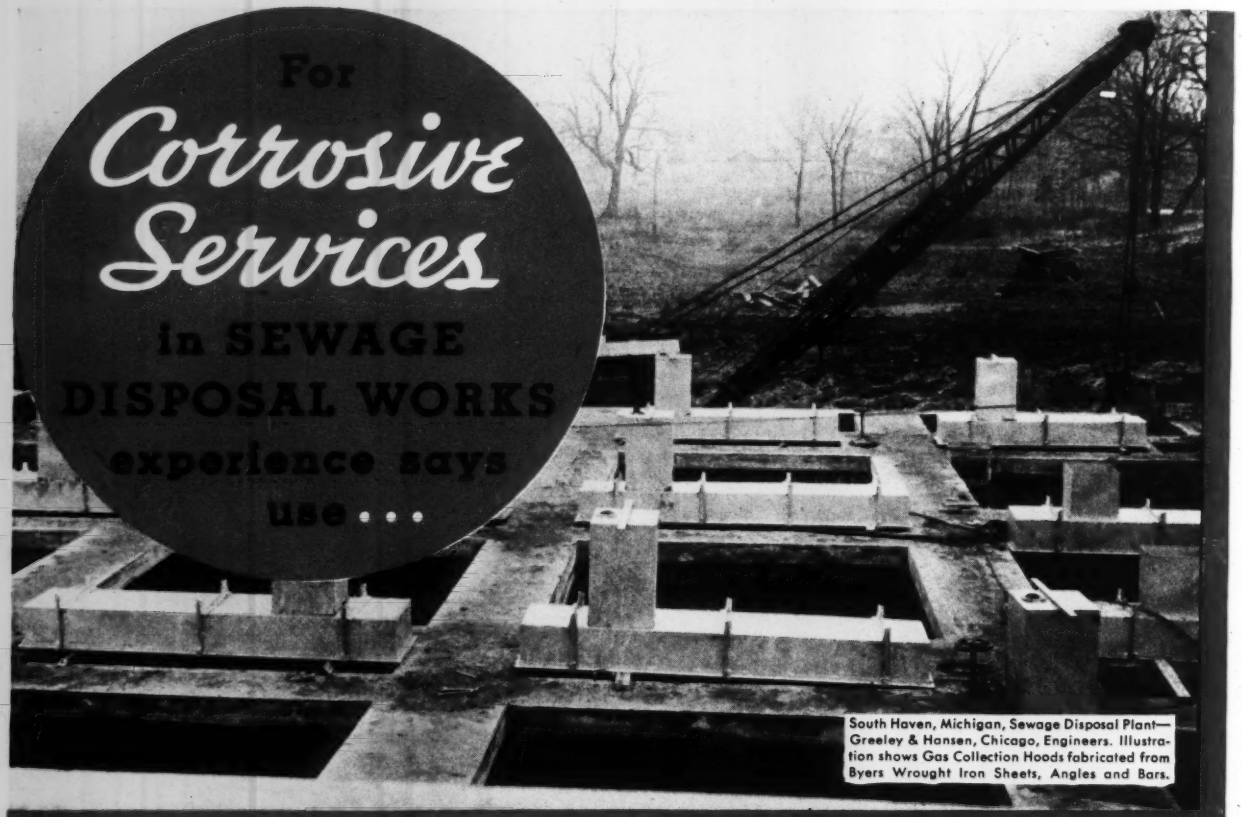
Loading "tets," concrete blocks cast in tetrahedral form, used in bank revetment operations on the lower Mississippi River.

Huge Protection Pier Required for Swing Bridge on the Saguenay River . . . . Dirt Streets Surfaced With Slag . . . . Bank Revetment Developments on the Mississippi . . . . Drought Affects Highway Work . . . . Germany Begins Construction of Express Highway System . . . . Oxy-Acetylene Cutting of Structural Steel . . . . California Makes Progress Against Earthquake Hazard



South Haven, Michigan, Sewage Disposal Plant—Greeley & Hansen, Chicago, Engineers. Illustration shows Gas Collection Hoods fabricated from Byers Wrought Iron Sheets, Angles and Bars.

BYERS WROUGHT IRON

CORROSIVE conditions encountered in sewage disposal are particularly severe because sewage contains several highly corrosive constituents. Hydrogen sulphide, oxygen and salts in solution are always present. This combination alone rapidly corrodes ordinary ferrous metals. Wrought iron, however, has proved its durability in sewage service and today is being used in disposal plants for various applications, such as sludge lines, heating coils in digestion tanks, hand railings, gas collection piping and outfall lines.

Thus you see, far-sighted, well-informed municipal engineers and officials have their own experience as well as many authenticated service records to back up their wrought iron specifications for all corrosive services in sewage disposal.

The fact that Wrought Iron is being specified is a matter of community interest. Public funds are well spent where Wrought Iron is used. The cost is a small item in the overall cost and municipal officials and engineers are to be congratulated on their choice of this long-lasting material. Both the good health as well as the financial interests of the community are involved.

South Haven, Michigan, joins the front rank of American communities with this modern sewage plant, where Wrought Iron is on the job. Hand railings and the piping in the gas collection system are Wrought Iron. The gas collection hoods over the gas slots of the digestion tanks were fabricated from Byers Wrought Iron sheets, angles and bars.

On the jobs now under your consideration, why not use Byers Wrought Iron in the corrosive services where replacements come too soon for ordinary pipe, plates and sheets? Call in a Byers Engineer or write our Engineering Service Department for photos of recent installations and other data, and let us review some of the hundreds of Wrought Iron service records now in our files. A. M. Byers Company, Established 1864. Pittsburgh, Boston, New York, Philadelphia, Washington, Chicago, St. Louis, Houston, Los Angeles.

BYERS GENUINE WROUGHT IRON PRODUCTS

PIPE · WELDING FITTINGS · RIVETS · SPECIAL BENDING PIPE · BAR IRON
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STANDARD of QUALITY for 70 YEARS · TODAY BETTER THAN EVER

To Build Construction Volume

IN A recent article, Walter Lippmann brings welcome and well-timed support to those who have urged that the construction industry be effectively hitched up as the wheel-horse of recovery. "It is generally understood now," he says, "that the focus of the depression, apart from exports, is in the construction industries * * * There is little doubt, therefore, that to revive construction is the most important thing that can be done to promote general recovery."

After indicating the very large possible demand for new construction, he concludes, that "there is no real doubt, then, that there is a big potential demand for the work of the construction industries" and that "the problem is to bring together the demand, the labor, the materials and the money."

"What keeps them apart?" asks Mr. Lippmann. Then, tersely, he answers: "Construction is too expensive." He believes that material prices, interest rates and wage scales must be scaled down *simultaneously* if we are to stimulate the volume that is needed to convert prices, rates and scales into profits, incomes and pay-rolls. He urges, therefore, that producers, workers, and lenders cooperate to effect the necessary adjustments and refers to "intimations from Washington that the administration is working along these lines. Not only would such a policy stimulate private construction," concludes Mr. Lippmann, "but it would make the whole public works program move more quickly and more effectively in reemploying labor and in priming the pump. It would also tend greatly to stimulate the resumption of local public works which must sooner or later be resumed if the federal government is to terminate its emergency expenditures."

It is significant to have this from an authority outside the construction industry. For a long time, some within our own ranks have advanced similar suggestions, but too often they have won scant respect for their views. A far-seeing and conscientious NRA official last fall saw this situation clearly and recommended a realistic program to deal with it; he became the target of bitter attack by labor and but for the steadfast support of his superior he might have been thrown to the wolves. The labor provisions of the PWA, established despite the protests of those seeking the welfare of the construction industry, violated these policies; in consequence they have helped to bedevil its operations. Many producers who fought strenuously for code provisions to foster, through one device or another, the maintenance of higher prices showed little patience with reminders that high prices for capital goods are likely to throttle volume more rapidly than they can swell profits. Investors, intent only on conserving the inflated values of their existing investments, thought nothing of the new investors to whom we must look for new employment.

This is written in no carping spirit but rather to acclaim the progress that has since been made. The mood of that time was natural and understandable. Remedies conceived to meet the emergency needs of the consumable goods industries were applied without second thought to the capital goods industries. Wage and price policies that seemed to help in consumer markets of relatively constant demand were imposed upon markets that were doomed almost to extinction until costs could be adjusted to diminished incomes and profit expectancy. In our effort to increase mass purchasing power we forgot that for the half of our people engaged in producing capital goods no underpinning of crumbling investment institutions, no boosting of prices or wage scales could compensate for a dearth of new enterprises, new orders and new jobs.

So there is ground for encouragement in the prospect that investors and enterprisers may now unite to throw off the mortgage and financial rackets that have taken toll of them both, that producers may see price as being eternally subordinate to volume as a generator of profits, that labor may see wage scales as secondary to volume of employment in the swelling of pay-rolls and pay envelopes. Such unity is necessary to assure the simultaneous adjustment of these related factors so properly emphasized by Mr. Lippmann; lack of this assurance accounted for much of the distrust that prevented earlier acceptance of these policies by the various interested groups.

If the administration will rally to this standard all ranks of the construction industries and lead them boldly into action, it will strike one of its mightiest blows in behalf of early and substantial recovery.

Willard Chevalier

ENGINEERING NEWS-RECORD

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Moving earth to build a race-track near Los Angeles. In two 12-yard trailers, the "Caterpillar" Diesel Seventy-Five moves 119 yards per hour on an 800-foot haul.

"I'm going to 'Caterpillar' Diesels altogether"

● ● SAYS C. G. FULLER, CONTRACTOR, OF BARNWELL, SOUTH CAROLINA, WHO ALREADY HAS THREE "CATERPILLAR" DIESELS AND FIGURES THEIR FUEL SAVING WILL PAY FOR THEM IN LESS THAN TWO YEARS.

On a road-building and creek-diversion job near Bloomington, Ill., the "Caterpillar" Diesel Seventy-Five pulls a "Caterpillar" Grader at a fuel cost of $1.96 per 10-hour shift.

AMERICA GOES DIESEL

In the foothills of the Sierra Nevadas, in California, this "Caterpillar" Diesel Fifty supplies material to a gold separator.

Every power user is doing a lot of figuring these days. Figuring gasoline costs—figuring the savings from a tractor that burns low-price Diesel fuel, and less of it—figuring the profit that he can earn from investing in "Caterpillar" Diesel power. Many have reached the conclusion that they can't afford not to adopt this modern equipment. Today there are nearly 3000 owners of "Caterpillar" Diesels—tractors and engines. Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

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In the News:

The PWA has lost no time in putting to work the $500,000,000 additional money made available to it by Congress. Its first two announcements included 483 projects scattered over most of the country and totaling more than $66,000,000. Most of the allotments were for small projects that can be put under construction quickly. Allotments up to the end of the week had passed the $200,000,000 mark.

A Big Allotment, $8,000,000, has been made to the District of Columbia for the construction of a sewage-disposal plant to reduce the pollution of the Potomac River. Last year the PWA put up $40,000 for the engineering studies.

The Initial Stage of the New York Central Railroad's $100,000,000 West Side Improvement project at New York, the new terminal and the elevated line connecting it with the 30th St. yards, was formally put into service on June 28, and it is hoped that the trains actually will be off the streets south of 30th St. within a short time, as the line is 85 per cent complete. This section eliminates 66 of the 105 grade-crossings on the entire West Side line.

The President signed the Housing Act on June 28, and at the same time the National Retail Lumber Dealers' Association announced that it had ordered reductions approximating 10 per cent on the prices of building materials handled by its members. It hopes thereby to stimulate the start of home construction and repair under the act. The Administration hopes that labor will see its way clear to accept lower hourly wages on the prospect of more hours of work and that capital will take lower interest rates on building loans and mortgages.

The Federal Government's old difficulty with cement prices cropped up again in connection with the bids for cement for Fort Peck Dam. Manufacturers, acting under the provisions of the cement code, all met the delivered price of the closest mill, so that they all bid the same price f.o.b. the nearest railhead. As a result, only 200,000 of the 600,000 bbl. to be bought were ordered.

The President's executive order authorizing a 15 per cent cut below filed prices when bidding on government supplies is the Administration's answer to the problem raised by uniform bids such as these on the Fort Peck Dam cement. Its effect on cement prices will not be known until there is another call for bids on a large order.

Ordered by the Supreme Court to pay a fine of $5,000 a day for every day after July 1 that it continued to dump garbage at sea, New York put the first of its large new incinerators into service on June 28. Three more will be in operation by July 1. Thus the long controversy over pollution of the New Jersey beaches comes to an end.

In This Issue:

High Tides and Heavy Ice combined to make the construction of piers for a bridge across the Saguenay River at Chicoutimi, Quebec, an unusual task. Construction of the fender pier for the swing span was particularly difficult. The completed structure looks more like a battleship than a bridge pier.

With CWA Labor and crushed slag from the neighboring mills, Pittsburgh has been able to put a serviceable surface on many of its unpaved streets in districts where property values are too low to permit paving.

The Use of a protective armor of concrete tetrahedrons over a layer of gravel is one of the new types of revetment being tested on the lower Mississippi. The method of using the tetrahedrons and the manner in which a large part of them have been made are described in this issue in the second of two articles on revetment developments.

Germany has inaugurated construction of 3,800 miles of a 7,500-mile system of toll roads for high-speed through travel. A summary of the project is given in this issue.

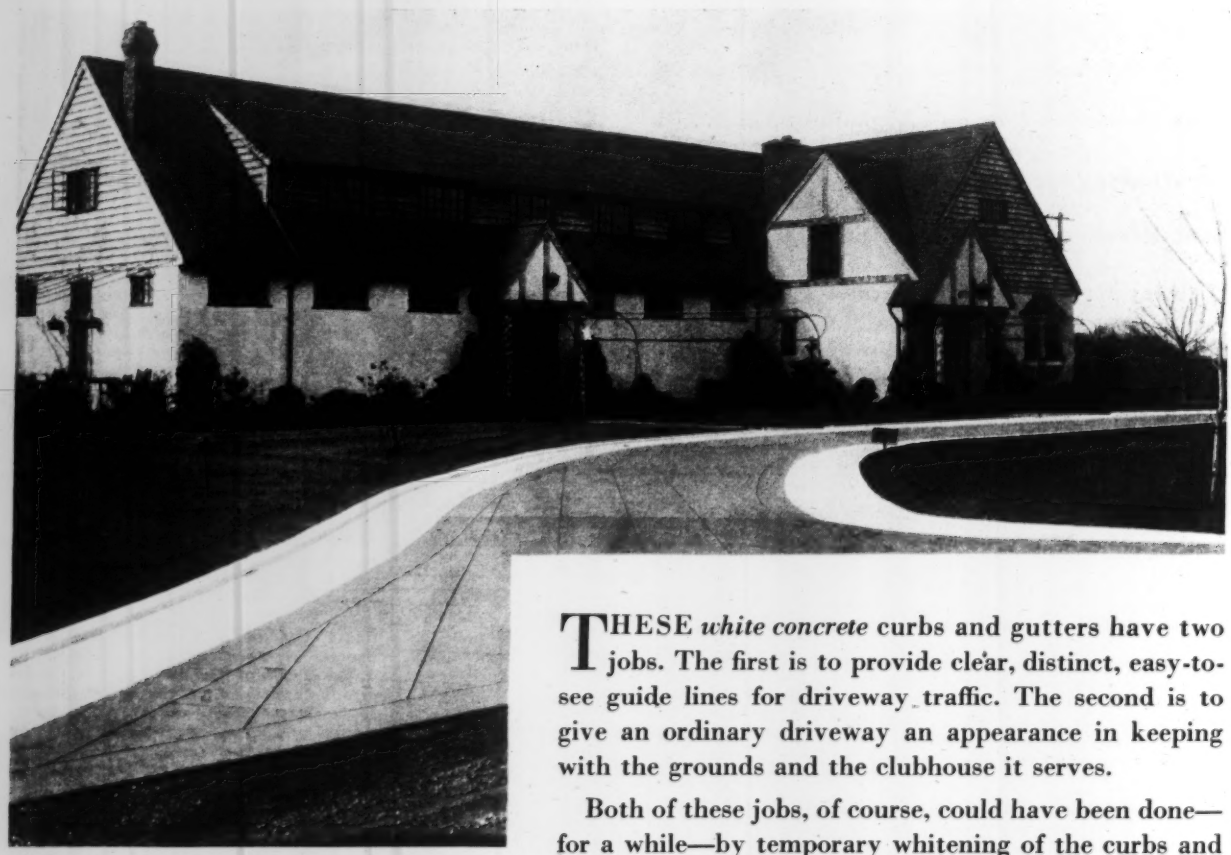
Because of the widespread use of oxy-acetylene cutting in structural-steel construction, a set of recommended practices has been drawn up by a group of interested organizations. They are presented here in condensed form.

Since the Long Beach earthquake last year, rapid progress has been made in California toward full recognition of the need for providing against seismic risks in building codes.

A Decline in Shipping in England has centered attention on port reorganization and consolidation. The British Institute of Transport recently has made a report on the subject that will be of interest in this country.

Current Figures for construction materials and labor and heavy construction statistics for the first half of the year are given in the pages following the news pages.

White Concrete Curbs FOR APPEARANCE ...*as well as Economy*



White concrete curbs and gutters built with Atlas White portland cement at Oceanside Golf Links, Oceanside, L. I., N. Y. Paul Jagow, architect. Wilfred Stewart, general contractor. Both of Lynbrook, L. I., N. Y. (Note—Atlas White was also used for the attractive, durable stucco on the clubhouse.)

THESE *white concrete* curbs and gutters have two jobs. The first is to provide clear, distinct, easy-to-see guide lines for driveway traffic. The second is to give an ordinary driveway an appearance in keeping with the grounds and the clubhouse it serves.

Both of these jobs, of course, could have been done—for a while—by temporary whitening of the curbs and gutters. That would have been cheaper—for a while. But because *final* cost was figured and because *continuous* good appearance and service were required, *permanent* white concrete was used.

These curbs and gutters will never need replacement. There will be *no* maintenance costs. They will *stay white*, spic and span, always. For complete information, write Universal Atlas Cement Co., *Subsidiary of United States Steel Corporation*, 208 South LaSalle Street, Chicago.

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ATLAS WHITE MARKERS AND CURBS

Made with Atlas White Portland Cement—Plain or Waterproofed

ENGINEERING NEWS-RECORD

New York

July 5, 1934

FIG. 1.—PROTECTION PIER 430 ft. long, for swing span of Saguenay River bridge in Quebec, is among largest ever built.

Chicoutimi Swing Span Requires Huge Protection Pier

New seven-span bridge over the Saguenay River at Chicoutimi, Quebec, includes a 375-ft. swing span protected, in open position, by a timber and concrete pier 430 ft. long inclosed in steel sheetpiling

AN UNUSUALLY DIFFICULT foundation operation characterized the consrtuction of the new bridge over the Saguenay River in Quebec joining the city of Chicoutimi on the south shore with the town of Ste. Anne de Chicoutimi opposite. Located about 70 miles from the St. Lawrence River, Chicoutimi nevertheless is subjected to 20-ft. tides and, in addition, is in a territory where flood and ice conditions are always severe. Two attempts were made before the pivot pier of the 375-ft. swing span and its protecting pier were successfully completed. The combined protection and pivot pier, 430 ft. long, with pointed nose upstream and downstream, is so large as to suggest a battleship or a lake boat rather than a bridge pier.

The new bridge, located about 9 miles below the well-known Chute-à-Caron hydro development, fills a vital need, for, prior to its construction, interruption of the ferry service between the two towns necessitated a detour of over 40 miles. And in the late fall and early spring the river often could not be crossed for periods of six weeks at a time.

Superstructure

The superstructure of the Chicoutimi Bridge consists of six through Warren truss spans, each of 185 ft., and the 375-ft. swing span A 20-ft. roadway and two 5-ft. sidewalks are provided; they are of reinforced concrete on the fixed spans and of laminated creosoted timber on the swing span

Contract for the superstructure was awarded to the Eastern Canada Steel & Iron Works, Ltd., Quebec, which fabricated the material for the fixed spans; the fabrication of the swing span and all of the erection was sublet to the Dominion Bridge Co., Montreal. Contract for the substructure was awarded in September, 1931, to A. Janin & Co., Ltd., of Montreal. The bridge is to be operated by the provincial government as a toll structure.

As an unemployment measure, the substructure work was started immediately after the award of the contract, and some work was done before ice conditions became too severe. However, not much could be done until after the normal spring flood of 1932.

Flood records

Floods in the Saguenay are variable and severe. The river is fed mainly from Lake St. John and also by a few minor rivers. According to twenty-year records, the normal spring flood starts about May 12 and ends on June 28, the maximum flood prior to constructing the bridge having been on June 1, 1928, totaling 350,000 sec.-ft. Fall floodflows due to rains are not generally serious and remain on the average under 85,000 sec.-ft. In 1932, in addition to the normal spring floods, there were four other dis-

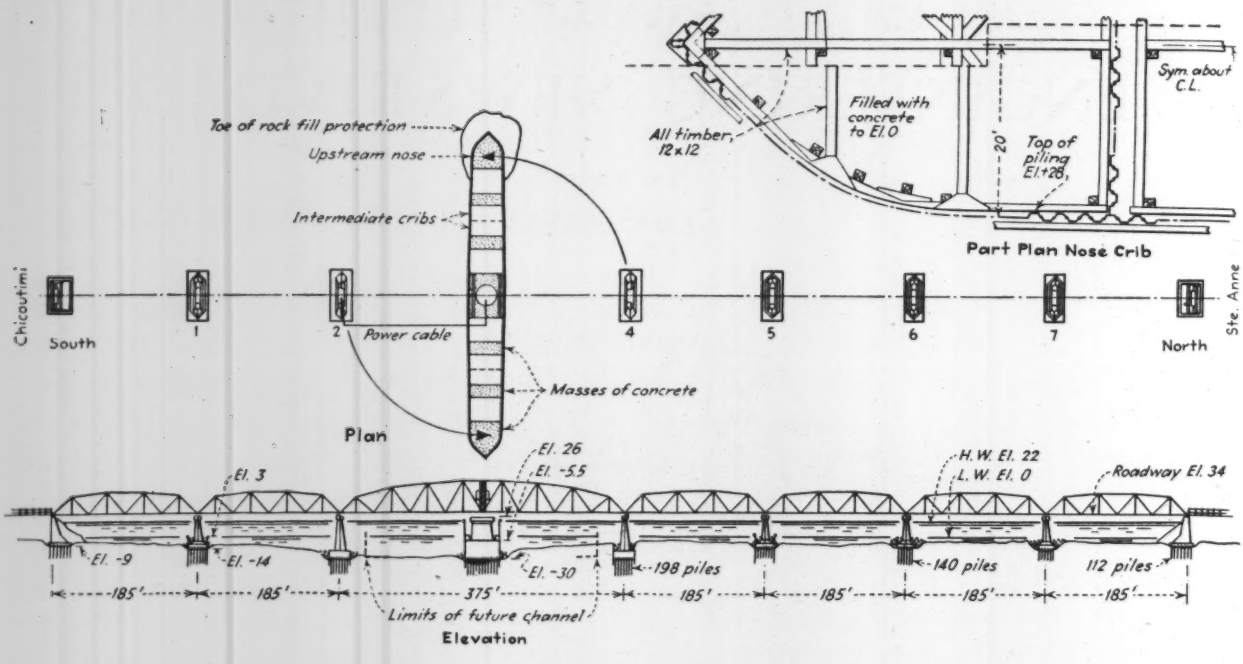


FIG. 2—CHICOUTIMI BRIDGE consists of six simple truss spans and a swing-span of unusual length. Foundation construction was made difficult by the extreme range between low and high water that was experienced several times.

tinct peak flows above 100,000 sec.-ft. The average summer flow was slightly over 90,000 sec.-ft., which was the highest on record. In contrast, the 1933 flow was the lowest on record, varying between 17,000 and 35,000 sec.-ft. Such flow conditions make plain the uncertainty and difficulty that attended foundation construction in the river.

Borings showed clay to a depth of 90 ft. and only sand below that level, making piles necessary. The swing-span pier and the two on either side of it were founded about 50 ft. below high tide, while the other piers are about 36 ft. below this same level. Relatively shallow excavation in the bottom of the river was required.

Progress of work

During eight months of 1932, with average flows about equal to the usual spring flood, floating equipment placed the cofferdams for the fixed-span piers, and these foundations were completed, representing an unusual accomplishment. The construction of the pivot pier for the swing span was the last operation planned for the year. This pivot pier was designed as a cylinder of reinforced concrete about 28 ft. in diameter, hollow on a diameter of 18 ft. and with a 6-ft.-square reinforced-concrete column in the center, connected to the cylindrical shell by two cross-walls. The caisson for this pier therefore was made in the form of a circular frame made up of angles and plates connected vertically by latticed columns. The height of the frame was 49 ft. and the diameter about 50 ft. With the timber bracing, the weight was about 70 tons.

When completely assembled, the structure was towed out to the site and lowered onto the riverbed, anchor cables attached, and driving of the steel sheet-pile inclosure was started.

When about a third of the piles were in place, an unexpected flood occurred, breaking one of the anchor cables and causing the collapse of the latticed columns on the downstream side, which caused the frame to lean about 20 deg. Efforts were made to raise the frame, but flood conditions became worse, and finally the frame completely collapsed and was carried downstream. During this flood period the peak flow reached 250,000 sec.-ft., or about four times the average fall flood. These operations practically completed the work for the 1932 season.

New center-pier design

As a next step, the design of the protection pier, previously conceived as a relatively simple structure, was altered to incorporate the cofferdam for the pivot pier. Independent nose piers up and downstream were also included, to be incorporated into the whole after the upstream nose had served both as deflector and anchorage during the construction of intermediate and center cribs.

The complete protection pier, as thus planned, was 430 ft. long and essentially contemplated the construction of three "islands" formed by steel sheetpil-

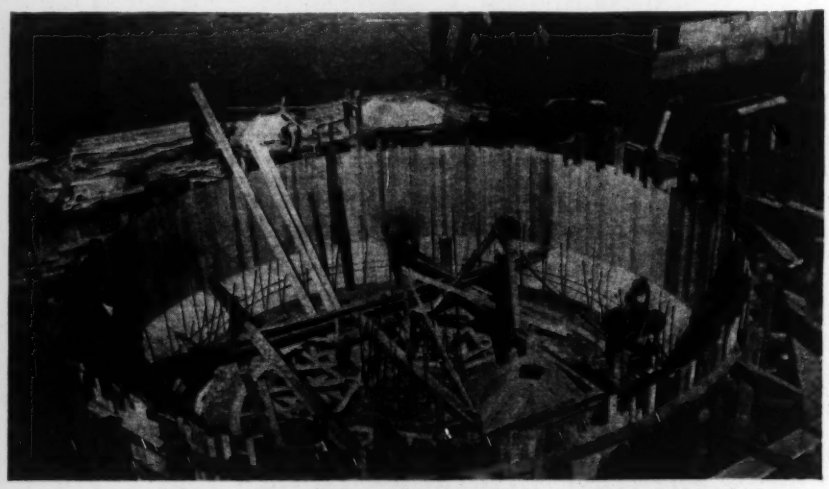


FIG. 3—PIVOT PIER of Chicoutimi Bridge under construction within the cofferdam formed by the protection pier.

ing and connected by steel piling walls suitably braced and anchored, the whole structure presenting the appearance of a single long and narrow pier. The upstream and downstream nose sections (two of the "islands") were filled with concrete cast against the piling from the pre-excavated grade at El. —25 to low tide level at El. 0. The base of the pivot pier (58 ft. long, 44 ft. wide), forming the third unit or island, was formed by concrete from El. —30 to El. —5.5. Between each nose and the center caisson were placed two intermediate cribs, 66 ft. long, each of which contains a transverse pocket of concrete 16 ft. long, also topped off at low-tide level.

The design of the protection pier is such that impact from a ship or from floating ice, regardless of the direction or the elevation of the blow, will be distributed to and absorbed by the masses of concrete. Each one of the steel piles is bolted to the timber framing of the cribs, and occasional piles of the nosings and center cribs are perforated, to admit of the circulation of water. Along the four intermediate cribs the piles alternate in lengths of 65 and 30 ft., the long ones being driven 15 ft. below excavated grade, the short ones extending to only 5 ft. below low tide and being held in that position by bolts. This staggered piling arrangement, besides providing for circulation of water, gave a substantial economy in piling requirements. The piling around the nose and center sections is about 70 ft. long and was driven to 15 ft. below grade.

Construction

The upstream nose was the first section of the pier to be constructed, a timber crib (built to its full heignt of 46 ft. on the ice during the winter) being accurately set in position by means of derrick scows and tugs and then held in place by means of concrete blocks as ballast. The anchorage system consisted of four 4-ton anchors placed about 700 ft. upstream on a line perpendicular to streamflow, with 200 ft. separating the two center blocks and 50 ft. between the outside and the center anchors. The anchors were linked together by chains and connected to the nose caisson by two 1½-in. and two ⅞-in. steel cables.

Driving started with the nose pile and proceeded thereafter down the two curved sides of the streamlined nose and along the diaphragm end wall. Tee piles, specially riveted, were used at the two corners from which the two long side walls were started. This upstream nose was completely constructed and filled with concrete up to low-water level in the short working period between the break-up of the solid ice and the start of the spring flood—in this case just about three weeks. River work had then to be stopped for five weks until the 100,000-sec.-ft. flood had subsided, when the construction of the long side walls was started. The piles forming these were placed and driven in a similar manner, set against timber cribs resting on the excavated river bottom.

In a similar manner the 70-ft. piles forming the center caisson were placed and driven, the crib supporting them having its center section constructed of steel joists that were later concreted into the body of the pier. The projecting ends of these beams were later cut off so as to isolate the main pier shaft from the steel guard-walls. After the piles had been driven to their penetration of 15 ft. below the dredged level, the entire crib was raised a distance of 15 ft. by means of winches, in order that the concrete for the base of the pier might be placed directly against the piling after the timber bearing piles had all been driven and cut under water to required level.

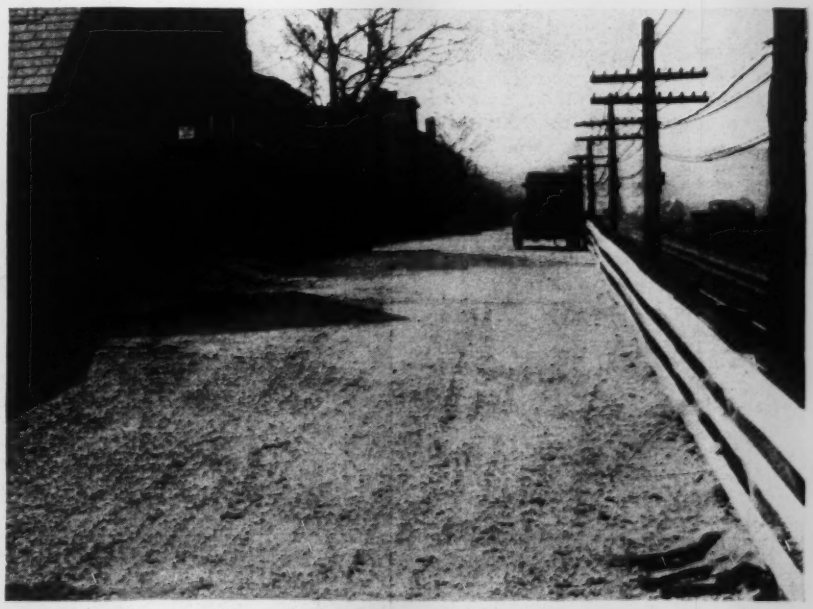
With the concrete seal complete, the caisson was dewatered followed by form construction and placing of the pivot-pier concrete, the steel sheetpiling for the downstream side guard-walls being placed and driven at the same time. The downstream nose "island" was finally constructed. All the piling was eventually given two coats of special protective tar and capped with an 8x16-in. timber coping.

The work was carried out for the department of public works of the Province of Quebec: J. N. Francoeur, minister, Ivan E. Vallee, deputy minister and chief engineer, and Olivier Desjardins, joint chief engineer. The consulting engineers for the swing span and the protection pier were Monsarrat & Pratley, Montreal. The contractor for the substructure and bridge deck was A. Janin & Co., Ltd., Montreal.

Dirt Streets Surfaced With Slag as Unemployment-Relief Measure

THROUGH the opportunities made available by the Civil Works Administration and the relief works division of the Pennsylvania Unemployment Relief Commission, the city of Pittsburgh has made usable in all weather more than 50 miles of dirt streets in residential districts, at the same time giving employment to as many as 3,000 men. These streets, many of which were completely impassable in winter weather and thoroughly inadequate at all times, have been surfaced with crushed slag; side slopes have been stabilized and drainage facilities have been provided.

There are in Pittsburgh 484 miles of unpaved streets. They are generally found in districts where property values are low and where a first-class paving improvement would involve a cost entirely too high to be borne by the properties so benefited. Many of them are hillside streets on which grades run as



SLAG SURFACE makes dirt street usable. Before improvement this street was only half its present width. A timber-crib retaining wall built along the railroad at the right supports the added width.

DIRT STREET, of limited service at all times and impassable in times of bad weather. More than 120 miles of dirt streets have been made usable at low cost by surfacing them with crushed slag.

high as 20 per cent. In winter these streets have been completely impassable, and the delivery of coal and other bulky or weighty material has been extremely difficult or quite impossible. At all times their condition has been extremely bad. The fire hazard in such districts has been particularly serious.

As early as February, 1931, the city began surfacing these streets as an unemployment-relief measure. At that time unemployment relief was financed either by private charity or entirely as a municipal undertaking. The streets selected for first improvement were those of worst condition, and about 70 miles had been surfaced up to the time the CWA was organized in November, 1933. The program was then greatly augmented under the auspices of the CWA and, since the termination of the CWA program, as a relief-work project. The result of this augmented program was the improvement of about 50 miles more.

Types of work

The work on the streets involves minor grading, the widening of curves, the stabilizing of steep side banks by the construction of crib retaining walls, draining, and surfacing with air-cooled crushed slag. Gutters are dug for surface drainage and, where necessary, they are paved with brick. In the grading no cut of more than 2 ft. is made. As excavation to the established grade for many of these streets would involve deep cuts and the possible undercutting of buildings, with the consequent heavy cost both for the excavation itself and the resultant property damage, the surfacing has been done at the traffic grade instead.

The surfacing itself involves, first, the application of 4 in. of crushed slag, ranging in size from 3 in. to $\frac{5}{8}$ in. and, second, 2 in. of fine slag, from $\frac{5}{8}$ in. to dust. The chemical composition of the slag is such that there is enough free lime in it to cement the particles together in time. Where feasible—that is, where grades are not too steep—a 5-ton roller is used on the slag. A heavier roller could not be controlled on the grades. Most pavements have been laid 14 ft. wide.

On streets where the local traffic is unusually heavy (about 2 per cent of the total mileage) the surfaced street is regraded during the second season, and additional treatment is given. This additional treatment consists of a prime coat of hot asphalt, 0.17 gal. per sq.yd., a sprinkling with slag chips to the extent of 40 lb. per sq.yd., the application of an asphalt seal coat, 0.25 gal. per sq.yd., and another sprinkling with slag chips.

There are two ways of laying up the paved gutters. On the steeper slopes, those of $7\frac{1}{2}$ per cent and more, the joints are filled with cement grout. On lighter slopes the brick are laid up dry, and granulated slag is swept into the open joints. Free lime in the slag again bonds the brick together.

The previous practice in regard to these streets was to keep filling them with cinders. Storms would wash these cinders down the slopes and the catch-basins, and sewers would become clogged.

The cost of the street-surfacing program, including the asphalt application, has been $1.23 per sq.yd., exclusive of the cost of the gutters. For a 14-ft. pavement this amounts to about $2 per running foot, all costs included.

The program has been under the jurisdiction of the department of public works, of which Leslie M. Johnston is director and Charles M. Reppert chief engineer. The direct supervision of the program has been in the hands of H. D. Johnson, Jr., construction engineer, and W. B. Shafer, assistant superintendent, bureau of highways and sewers.

CONCRETE CRIBBING under construction. When filled with rock, it will support the widening of this hillside street.

Bank-Revetment Developments on the Mississippi River

II—Tetrahedron-Block Revetment

Field-application stage reached in the development of two new types of bank revetment—Tetrahedral-shaped concrete blocks over a gravel mat being tried in the Memphis and Vicksburg districts—Unique plant developed for their manufacture

TWO NEW TYPES of bank revetment are under study on the lower Mississippi River by the district engineers of the U. S. Army. In the second New Orleans district, where experimental studies of asphalt as a revetment material have been underway for more than two years, a large plant for the field fabrication of a reinforced asphalt mat has been completed and is now being put through preliminary tests, as described in our issue of June 28, 1934, p. 825; and in the Memphis and Vicksburg districts large-scale tests are being made with revetments composed of gravel protected with tetrahedral-shaped concrete blocks. Revetments of this type were laid in the Memphis district during December, 1933, followed in January, 1934, by further construction of the same general type near Greenville, Miss., in the Vicksburg district. The following article relates to the latter operations.

In the tetrahedron revetment herein described the engineers of the Mississippi River Commission hope to develop a form of revetment that can be used in emergencies to combat an unexpected bank attack during high river stages. Heretofore, stone riprap has been the only type available for such use, and it is not highly effective and is expensive in the valley below Cairo. All other types, willow facines, board mats, concrete slabs and articulated mats of concrete blocks can only be placed when the river is not in flood. The same applies to the new asphalt-mat revetment described in the preceding article.

Tetrahedron revetment

The basic principle involved in the tetrahedron revetment marks a new departure in Mississippi River revetment practice. Use is made of a substantial blanket of gravel placed in direct contact with the bank, and on it are placed concrete blocks tetrahedral in shape. In essence, the gravel blanket is the revetment proper, while the blocks serve as a protective armor to prevent the gravel from being washed away. The function of the gravel is twofold: it prevents the finer bank materials from being eroded by the turbulence of the water, a common source of trouble experienced in the older types of revetments, and at the same time its permeability is sufficient to permit hydrostatic pressures on the water side and under side of the revetment to equalize under all conditions.

Adoption of a tetrahedral shape for the blocks is explained by the fact that such a shaped block, regardless of which of its four faces it rests on, offers a remarkably low area to direct thrust from the flowing water in relation to the area in friction against the bank. In any position, part of this thrust is converted into a vertical component tending to increase sliding friction. In order to determine the resistance that concrete tetrahedrons offer to the tractive force exerted by flowing water, experiments were conducted in the U. S. Waterways Experiment Station at Vicksburg, Miss., on various sizes of blocks placed on a mixture of gravel and sand. From the experimental data so obtained it was deduced that a concrete tetrahedron 12 in. in height will resist movement by hydraulic traction under practically all conditions normally obtaining in the Mississippi River between Cairo and the mouth. Blocks of this size have a content of 0.22 cu.ft., a weight of about 32 lb., and are of convenient size for handling. Placed at the rate of 120 per square (10 by 10 ft.), this calls for 1 cu.yd. of concrete per square, or the equivalent of a slab 3¼ in. thick. Spreading gravel after the blocks are in place is also being experimented with.

In the Memphis district, test sections 200 ft. long were placed at the ends of existing or new revetments built by the older methods in six different localities. Above mean low water the tetrahedral blocks in each instance were placed by hand on a gravel blanket 6 in. thick, while below the low-water line they were dumped from barges on a gravel blanket 10 to 12 in. thick. These revetments cover the entire bank, previously graded above water to a 1-on-3 slope, from top of bank down to and extending out about 250 ft. beyond the low-water line. Six different methods of distributing the blocks were experimented with. On the upper or dry portions of bank, blocks were hand-placed, using respectively 120, 150 and 200 blocks per square, while under water the number of blocks per square was 200 or 250. In one location only 100 blocks per square were placed in depths of water 30 ft. or less.

FIG. 1—BOTH HAND-PLACED and dumped tetrahedron are shown in this view of the tetrahedral-block revetment at New Madrid Bend, Mo. The blocks at the right were dumped after the river had risen, submerging the hand-placed blocks at the left.

In the Vicksburg district, test revetments extend from 2 ft. under the top of bank, or about 35 ft. above mean low water on the Greenville gage, to 50 ft. beyond the thalweg, usually a total horizontal distance of 400 ft. measured perpendicular to the center line of the river. Only one type of construction was experimented with, using 250 blocks per square on a 4-in. gravel blanket both above and below water. As 154 blocks placed edge to edge completely cover a square, the number actually used

FIG. 2—AT THE CUTOFF through Leland Neck, where the bank is subject to heavy attack by the river, tetrahedral blocks were dumped on the bank to check the attack. Though caving occurred near the end of the revetted area, as shown in this picture taken after the river had fallen, the erosion was checked where the blocks were fully effective.

gives more than complete coverage and permits considerable nesting. This was considered a desirable safeguard against the strong erosive currents to which the revetments near Greenville are exposed.

Up to the present time all placing operations have been performed by hired labor, using government equipment. Manufacture and delivery of concrete tetrahedrons and delivery of gravel were let by contract.

Block placing

The tetrahedral blocks are delivered to the government by the block contractor on barges at the river's edge, 25,000 to a standard 120x30-ft. barge. At the point to be revetted a line of barges, called "string-out" barges, is moored perpendicular to the shore, extending out as far as it is desired to place the revetment. A loaded barge is then towed to a position against the shore, with its long edge parallel to the shore and one end secured to the downstream edge of the string-out barges. When in position, men in the unloading crew are spaced at 4-ft. intervals along each of the long edges of the loaded barge and, at a given signal, begin throwing the "tets" overboard, each man throwing 50 tets. Count is kept by a man with a whistle, who blows 50 short blasts at close intervals. When this operation is complete, the barge is advanced 5 ft. along the line of stringout barges and the cycle repeated. At the end of the seventh cycle the inner edge of the block barge has reached the line of blocks first thrown overboard by men on the outer edge. Consequently, from this point the barge is advanced 40 ft. before another cycle is begun. By this method of unloading the barges each man drops 50 blocks over an area of 20 sq.ft., or at the rate of 250 per 100 sq.ft. This operation frequently is reversed and the work carried toward shore.

Because of the water velocity and increasing depth of the river at increasing distances from the shore the mat placed by the method just described is not rectangular in form but is a parallelogram with its long edges curved downstream. To determine what shape the mat takes, telltales are tied to a few blocks thrown over at intervals and their position on the bottom is determined. Depths and velocities also are taken at the same time, and from these data the engineers of the Greenville office are building up curves from which it is hoped that the shape of the finished mat can be determined simply by checking the depth and velocity.

Information as to the shape of the mat is essential to obtaining complete coverage of the bank to be protected; it also is needed for accurate placing of the gravel filling. In dumping the gravel, allowance has to be made for its greater downstream drift due to its smaller size and lighter weight.

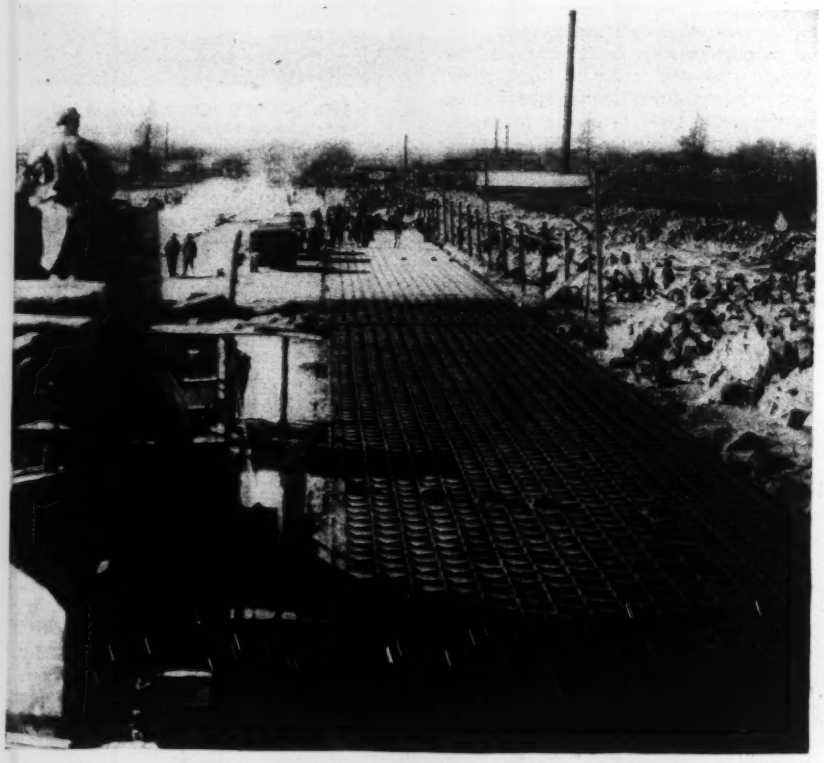
Block manufacture

The blocks required for the present work are being manufactured, in large part, at Greenville. That contract calls for 6,780,000 blocks delivered on barges, at the rate of 50,000 per day, at a cost to the government of $0.0789 per block. This cost figure is expected to be materially lowered after experience is gained in the manufacture of the blocks.

The following description relates to the Greenville contract. A much smaller contract at Memphis was executed by other means.

Individual steel forms of welded steel plates are used in the manufacture of the blocks at Greenville. They are assembled for concrete pouring in the manner shown in Figs. 3 and 4. The supporting structure consists of longitudinal lines of 1-in. plank on edge, with cross-walls of plank set diagonally

FIG. 3—FORMS FOR 25,000 BLOCKS are laid on either side of the plant's roadway shown at the left, and concrete is placed in the forms by paving mixers traveling along the roadway.



to form a line of triangular pockets into which the individual forms or cups are dropped. The upper edges of the three sides of each cup are turned over to form a lip that rests on the plank supports when the cups are in place.

In welding each cup a small hole was left at the tip to provide drainage of water or excess oil that settles to the bottom of the cup before concrete is placed in it. Oil is sprayed over the cups after they are in place to keep the concrete from sticking to them.

The general arrangement of the contractor's pouring yard is indicated in the accompanying illustrations. It consists of two parallel plank roadways flanked on the outer sides by the form beds, each bed containing 25,000 tetrahedron cups. Paving mixers are used to place the concrete, one mixer operating on each roadway independent of operations on the adjoining roadway. Air and water lines are laid along the edge of the roadway and have valve connections at frequent intervals. Steam lines from a boiler house near the middle of the yard are run back and forth under the form supports to provide heat for winter operations, also to aid the hardening of the concrete. Sand, gravel and cement are delivered in bulk at one side of the yard, where a batching plant loads trucks supplying the pavers, each of the six trucks used carrying two batches of sand, gravel and cement. Calcium chloride to speed the hardening process is added to the mixing water in the mixer.

During winter weather the sand, gravel and mixing water were heated, and until recently a high-early-strength cement was used to insure sufficient hardening to permit handling the tetrahedron blocks within 18 to 20 hours.

The whole yard is well lighted for night operation.

Concrete is delivered to the forms by the paving mixers in 1-yd. batches and is spread across the forms by men with shovels working on top of the forms. As the paver advances, the concrete in the filled cups is vibrated and tamped.

As soon as a section is completed, it is covered with tarpaulins to keep in the heat and to protect the concrete against storm.

Eighteen hours after the first concrete has been placed, the stripping operation is begun.

In the stripping operation negro laborers working in gangs attack the task at the end first poured, beginning on both form beds at once. Covers are taken off, and a man with a hook, walking along the inner row of blocks, catches his hook under the inner corner of each cup and by a quick pull rotates it out of its pocket and turns it upside down on the adjoining row of blocks with a snap that usually releases the cup form from the concrete block. Behind this man come others, each of whom removes a form cup, dropping it face down on the form framework to

FIG. 4—THE METAL FORM CUPS are stacked on the form beds, as shown in the left foreground as they are removed from the "tets." Refuse that has fallen into the pockets in the form bed is then removed, and the cups are replaced and oiled ready for a new batch of concrete.

knock off any concrete adhering to it, and picks up the released block. Working with these men is a loader who releases a second block and hands it to the first man, who carries both blocks (sometimes three blocks) to stockpiles adjoining the form beds. These operations are carried on by large gangs working on adjoining sections.

As a section of form bed is cleared of blocks, men with small post-hole diggers go over the beds, removing the refuse that has fallen into the form pockets and replacing the forms. Oilers follow, and the forms are ready for fresh concrete.

The contractor has discovered that even a small amount of water on the forms will cause the concrete to stick. Consequently, for wet-weather operations, he has set up two movable sheds of light construction. They have frames spanning the form beds and can be rolled along over the beds to keep the form cups dry during the stripping and replacing operation. After the cups have been replaced and oiled, they are safe against exposure to rain during the short time required for the concrete-placing operation. In this connection it should be noted also that the contractor uses compressed air rather than steam for pressure on his oil-spray tanks, as he found that steam condensation collected on the oil surface in the tanks and occasionally was sprayed on the forms when oil was permitted to get low in the tanks.

The concrete crew comes on the job about three-quarters of an hour after the pullers. By that time a large enough area of forms has been cleared to permit them to begin pouring concrete.

The pulling and repouring operation takes about five hours generally. Pullers are paid for a full five-hour work period to keep them on their toes in an effort to get the maximum amount of pay for the least actual working time.

By carrying on his operations in an 18-hour cycle the contractor is able with his 50,000 form cups to produce as high as 70,000 blocks in a 24-hour period, thus giving himself a leeway on his 50,000 daily contract for very bad weather or plant trouble. His stockpiles hold 400,000 blocks to permit a period of curing under wet canvas covers before loading for delivery to barges on the river.

The 18-hour cycle calls for a considerable amount of night work on the part of the pulling and concrete gangs. The loading gangs work only in the day time, the loading of 50,000 blocks onto barges requiring about five hours. Working in gangs of six, these men load light trucks in the stockyard, 250 per truck, and like gangs unload on the river barges. The light trucks can be backed onto the barge deck for unloading.

Inspection is carried on at the delivery point on the barge. Blocks with less than 2 in. of any point broken off are accepted as Class A; those with point breaks of 2 to 3 in. are accepted as Class B and paid for at a reduced rate; blocks with point breaks of more than 3 in. are rejected. At this writing, of the 4,000,000 blocks made, 97 per cent fell into Class A, over 2 per cent were in Class B, and slightly less than 1 per cent were rejected.

Specifications call for 2,000-lb. concrete at 7 days. Actual results, however, have been far above requirements. Using high-early-strength cement, strengths of 4,000 lb. in 48 hours are obtained, and with normal portland cement strengths of 3,600 lb. at 4 days are common. Test specimens are taken during each pouring operation and are stored under the form-bed covers so that they are subject to the same heat and moisture conditions as the blocks.

With portland cement, a mix of 1:2.5:3.8 is used, approximately six bags per batch. With high-early-

strength cement five bags per batch were used, making the cost of cement about equal with either class. During warmer weather it is expected that the amount of normal portland cement can be further reduced and still obtain the strength necessary to permit handling the blocks within 18 hours of pouring, as is required by the present schedule. The water-cement ratio employed is 4.7. Calcium chloride at the rate of 1.85 lb. per bag of cement is added to the mix.

Contract for the blocks delivered at Greenville is being executed by the Simons-Mayrant Co., Charleston, S. C., with C. E. Page in immediate charge as superintendent.

The work on the project is being carried out under the direction of Brig.-Gen. Harley B. Ferguson, president of the Mississippi River Commission and division engineer of the Lower Mississippi Valley Division; Major L. E. Oliver, district engineer, Vicksburg; and Major W. M. Hoge, district engineer at Memphis.

Highway Problems Aggravated by Midwest Drought

Drifting soil and sand have obliterated some roads, and others have suffered from surface erosion—Construction work delayed by difficulties in building fills with dry soil

FURTHER information on the engineering problems resulting from the Midwest drought, supplementing the data on precipitation records published last week, is contained in the following statements from South Dakota, Kansas and Nebraska. This added material emphasizes the serious problem of highway maintenance resulting from wind-drifted sand filling ditches and blocking roadways. Also, highway construction has been rendered particularly difficult because the dried-out soil is unsuited for fills or surfacing.

Streamflow in the area has been seriously depleted, and many small streams in South Dakota are completely dry.

Conditions in Kansas

New problems in highway construction and maintenance have been experienced in the southwestern section of Kansas as a result of the extreme drought and the severely high wind experienced during the past two years. Many drought-relief projects have been undertaken by state and local governments in the construction of primary and secondary highways as a means of providing employment for those living in these seriously affected areas. In some cases this work has been carried on with great difficulty because of the problem involved in building an earth road of dry and dusty materials.

In many places new highway work undertaken has been almost obliterated by the erosion of the wind acting upon the dry unconsolidated material. Ditches have been almost completely filled with sandy dust, and road surfaces have been eroded almost to impassability. Drifts of dust have completely closed the new highways to traffic in some places.

These same conditions have also affected the existing older highways in the same area. Many well-established road surfaces have been rendered impassable from surface erosion caused by the wind and the drifting of fine soil. In some cases slat-type snow fences were erected in an effort to prevent drifts covering the traveled way. Where drifts occurred on the highways, it has been necessary to use snow plows, graders and other road equipment for removal.

A particularly serious problem is presented by the closing of the road ditches and drainage structures. All of this drifting material must ultimately be removed from the highway, since it is not fitted either for surface material or for the construction of shoulders.

The expense of these maintenance operations constitutes a considerable item in the expenditures of the highway department during the past season, al-

BURIED HIGHWAYS are common in southwestern Kansas, with sand drifts filling ditches and obliterating roadways. Maintenance of earth and sand-gravel roads is almost impossible.

though no separate accounting has been made to determine the actual cost.

The additional cost of operating and maintaining equipment in these dry and dusty areas is one of the unusual effects of the drought on highway work. Fine soils and sand have been almost continuously in the air for weeks and, even with precautions taken to prevent them from entering motors, tractor bearings and other equipment, it has been found necessary to change oil more frequently and, in general, to maintain greater care in the use of machinery both for construction and maintenance in these areas.

The proper maintenance of sand-gravel sections of roads and highways has become almost impossible in some areas as a result of the dried-out surface and wind erosion. The cost of maintenance on these sections probably has not been increased, but it is almost impossible to provide a suitable road surface regardless of the amount of maintenance.

This information on the effect of the drought on the highways of Kansas came from Ira E. Taylor, maintenance engineer, state highway commission. V. W. Buck is state highway engineer.

Construction of earth dams is being carried on in Kansas at several locations by the CCC, according to George S. Knapp, chief engineer of the division of water resources. On one of these dams it was necessary to resort to wells in an effort to secure water for moistening the fill, and this has yielded an insufficient supply, which has seriously handicapped the progress of the work. On other dams, however, little difficulty has been experienced in obtaining water for proper soil compaction.

Nebraska conditions

Subsurface moisture in some sections of Nebraska has been reduced to the limit necessary for continuous growth of alfalfa, which presents a serious condition in the agricultural state of Nebraska, according to Roy N. Towl, mayor of Omaha. According to Mayor Towl, the breaking up of these land areas for cultivation and the existing crop methods tend to reduce the atmospheric moisture and the precipitation during the late spring and summer months. Further, cultivation has resulted in erosion producing deep channels that tend to carry off surplus water in times of heavy rains, and little storage is provided by the ordinary methods of cultivation. The remedy would necessitate a change in the method of cultivation to minimize the evaporation of surface water.

COMPLETELY OBLITERATED under a 5-ft. drift of sand, this fence caught wind-blown weeds and debris to act as a snow fence in forming a drift.

Some of the farm area on the prairie sections of Nebraska, according to Mr. Towl, should never have been broken up, and very likely these border lands will have to be returned to pasture to effect the necessary change in evaporation and moisture conditions, which in turn would affect relief from wind erosion.

South Dakota

The three pictures on this page showing some phases of South Dakota drought conditions were provided by John F. Jacobs, district engineer, state highway commission. They were taken in the northeastern part of the state near Aberdeen. In this region the lack of precipitation combined with the severe spring winds has transformed the area into a virtual desert by stripping off the top soil following the drying out or overgrazing of the grass.

In many places the fences caught and held wind-driven weeds, forming a wind break, and the resulting deposit of sandy dust that formed across ditches and roads in places reached a height of 8 ft. A drift of sand that completely covered a 5-ft. fence is shown above.

The flow in the streams has reached unprecedented low levels. In the valley of the Elm River, about 8 miles north of Aberdeen, the strong northwest wind, carrying tons of sand, deposited its burden along the banks of the stream, almost completely filling the streambeds from bank to bank. By the first part of June this stream had stopped running completely and consisted of only occasional pools. Old residents of the district could not recall a time when this river had not had running water in it during the month of June.

As a protection against floods, the James River, at a point about 10 miles east of Aberdeen, had been provided with dikes 10 ft. high, and on several occasions these dikes were unable to hold the June floods of this stream. Today the river channel, shown at the left, is entirely dry and the dikes stand as much as 30 ft. high above the bottom of the dry channel.

ALMOST FILLED with sand, the Elm River channel, near Aberdeen, S. D., is completely dry.

TEN-FOOT DIKES, behind fence at right, were required some years ago to help minimize June flood damage on the James River in South Dakota, and today the river is a dry channel.

Germany Begins Construction of Express Highway System

New centralized federal highway administration plans 7,500 miles of toll roads restricted to high-speed through travel by automobile and inaugurates construction on first unit of 3,800 miles

By Bruno Wehner
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GERMAN highway administration, formerly divided between 26 state and county and 500 independent township highway departments, has been centralized. Failure largely of these decentralized authorities to cooperate had prevented any real development of a highway system capable of meeting modern traffic needs. To correct this condition, centralization of administration was enacted by the law of March 26, 1934, which provides a chief engineer for all German roads, to whom the state and county highway departments are subordinated.

This new law divides all roads into four classes: (1) express highways, (2) federal highways; (3) state highways, and (4) secondary roads.

The construction and maintenance of the express-highways *(autobahnen)* are delegated to a special company, called "Reichsautobahnen," which is legislated by its own law and financed by government bonds. These bonds are amortized by a toll paid for the privilege of using the highways, and justified by the savings to the motorist in oil, gasoline, tires and repairs. The cost of the federal highways is financed by the Reich, and those of the secondary roads by the counties. The apportionment of the cost of construction and maintenance of the secondary roads is made by the chief engineer of the Reich.

The administrative office, which pays for the roads, also owns them, this was not the case before the new law. For the through ways in cities and municipalities it is possible that the federal, state or county government will pay for a maximum of 18 ft. in width of the street if the community has no great economic advantage from the thoroughfare.

Reasons for express roads

The most essential feature of the modern development is the construction program of a system of express highways all over the country. What is meant by the terms *express highway* or *autobahn* (in Germany), *or autostrada* (in Italy)? They are highways that are especially designed to avoid passing through centers of dense population, to be absolutely free from grade crossings, to follow a straight line as nearly as possible, to exclude all unauthorized persons and vehicles. Moreover, the term express highway presupposes an ideal paving surface, a well-designed location and all technical equipments for the needs of express motor traffic. In the northern parts of Italy there exist already several express highways, and also in a few sections of the United States, notably in New Jersey. But one must realize that these highways are very expensive, and that is the reason why they are built in rather exceptional cases.

Why specifically is Germany planning to construct a system of such express highways and not the United States, where traffic is far heavier than in Europe? There are four chief reasons: (1) thickly settled communities are close together in Germany; (2) the streets of the old cities are narrow; (3) gasoline prices are high; and (4) the former subvention of the German railroad by the Reich.

1. The most important reason is that Germany is much more thickly settled than the United States, and the construction of bypasses, which would be the natural resort to accommodate express traffic, would create travel distances at least two or three times greater than a straight line between two points. Also, where the settlements are so close together as in Germany, the highway would consist almost entirely of a large number of bypasses. Traveling on such lines is naturally very costly and slow and destroys the general advantage of using highways.

2. On account of the age of German cities the streets are mostly very narrow; and since most of the buildings are of great historical value, the streets cannot be widened. Thus the traffic has a very low speed limit; yet, in spite of the low speed, there is a relatively high number of accidents.

3. Gasoline is three or four times as expensive in Germany as in the United States, and so from the standpoint of economical operation there is a further need for highways on which one can maintain a steady and reasonable speed. The slow-downs and stops in the numerous congested cities make long travel by car very expensive. Experience shows that traveling on an express highway saves 20 to 35 per cent of the costs of operations.

4. The German railroad, which is indirectly operated by the Reich, heretofore has had the advantage in competition with automobile traffic because of an already existing and highly developed track system and because of the benefits arising from general subvention by the government. This subvention had its chief origin in the fact that the German railroad had to pay a large part of the war debts. The success of this traffic policy of the Reich was another cause for the stagnation of automobile traffic.

For the reasons given it is especially necessary to stimulate the public to an increased use of motor traffic, and this can best be done by constructing a system of ideal highways. A further stimulus to the increased use of motor vehicles has been given by abolition by the government of all fees and other charges in connection with the purchase of new automobiles.

Plan of administration

By virtue of these special speedways the motor-vehicle traffic of Germany will gain a completely new economic justification. The express highway system is designed to fit into the scheme of a comprehensive national and regional plan. Work is provided to a large number of unemployed. It is expected that 500,000 to 600,000 people will be directly or indirectly engaged in the construction of the express highways, in the production and transportation of the building material, etc., for the next ten years.

The above-mentioned *(autobahnen)* law creates a new company for the construction and maintenance of the express highways; and this new company cooperates with the German railroad, which already has a highly trained and efficient staff of specialists for railroad earthworks, bridges, approaches, etc. The experience of these men will be used for the construction of the subgrade of the new speedways. Moreover, the close union of these two companies will abolish the old destructive competition of railroad and motor vehicles, which was paid for by the public.

The responsible head of the new company, *"Autobahnen,"* is the chief engineer of the German highway administration, who makes the final decision concerning the location of the highways and the design of the new express ways. He works with the German railroad, which has charge of the counties, townships and municipalities. Thus a link between the express highways and the other highway system is guaranteed, and the new organization has only to supervise the technical execution of the cooperative work of railroad and highway departments.

The new company divides the Reich into eleven districts, on the ground that each district is better able to adjust the construction to all local conditions than is a central bureau at the capital. These eleven districts have not been made on the basis of the old political

divisions, but purely on the basis of unified traffic regions.

Design and construction

The program of construction of the express highways provides for a first unit of about 3,800 miles, which later will be increased to about 7,500 miles. The first unit requires the transportation of 260,000,000 cu. yd. of earth, 54,000,000 bags of portland cement and 550,000 tons of steel for bridges, approaches, etc.

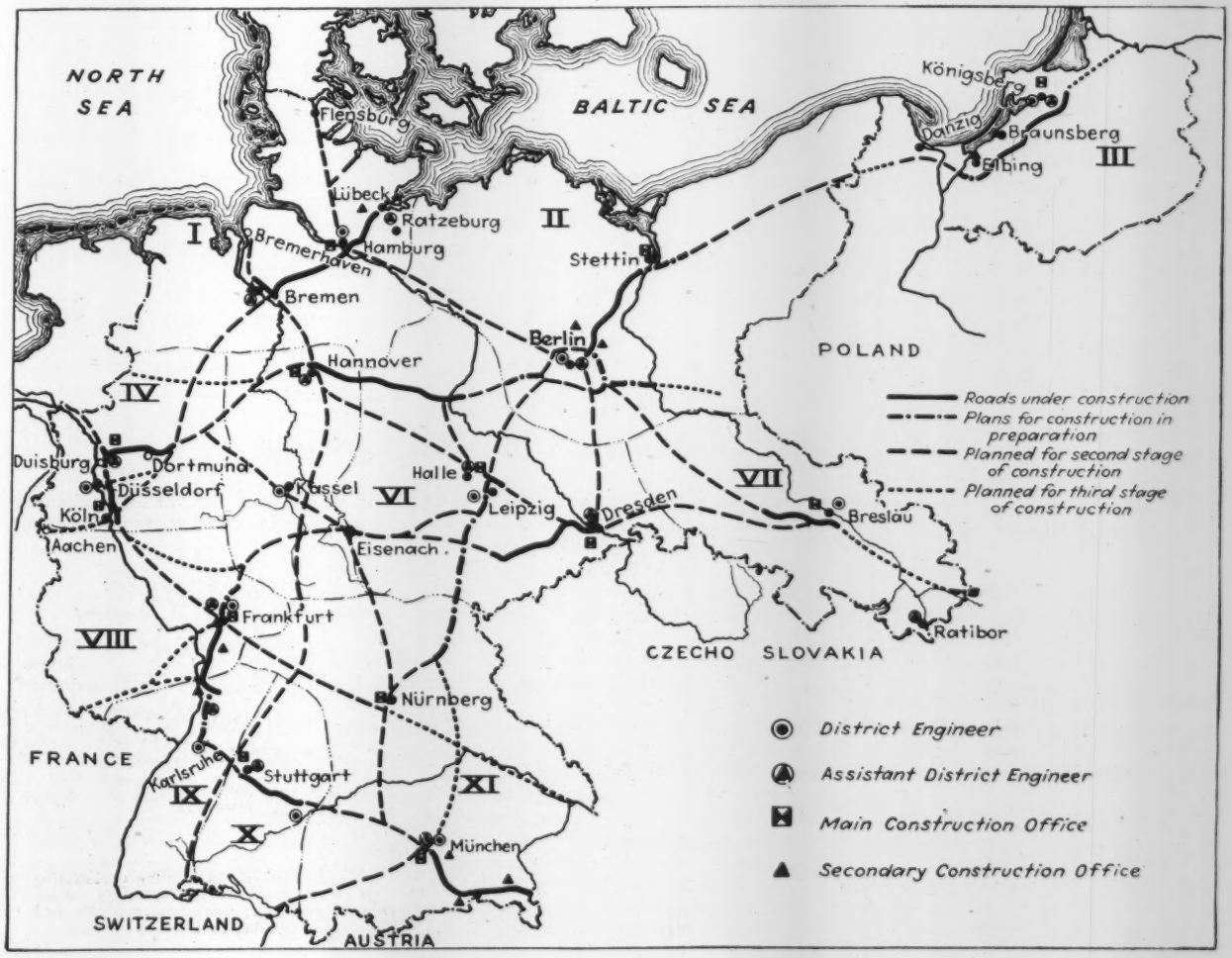
The normal cross-section of the express highway shows two lanes in each direction, which are separated by a grass strip of about 10 to 16 ft. in width. On both sides of the pavement are 5-ft. shoulders. The width of the lanes as well as the radii of the curves are constructed for a speed of 115 to 125 miles per hour. The pavement has a width of 25 ft. in each direction, and the transverse slopes will not be more than 1.5 per cent. The straight stretches of the express highway will not be longer than 2.5 miles in order to prevent fatigue of the driver. The tangents between two curves will be more than 600 ft. No grade crossings are permitted. Another requirement is that the highways must be accommodated to the surrounding landscape. In this respect the American parkways and the Mount Vernon Highway in Washington are excellent models.

At the moment a debate is taking place about the question of the best illumination for these speed streets. There are two possibilities for lighting these new highways:

(1) Direct lighting—that is, stationary lamps at various places along the street. At present a number of experiments in direct lighting are being carried out, but as yet no ideal system has been found.

(2) Illumination given by the vehicle themselves. As an aid for this type of illumination, reflectors will be placed alongside the road. Furthermore, bushes will be planted in groups, and only species will be used that will readily reflect the light from the autos. Thus at night the visibility will be improved, and at day the landscape will take on a more varied appearance. Moreover, the bushes will make the road a separate unit that can be entered only at especially constructed entrances. From the standpoint of the psychology of the driver, the bushes will not be only of one variety but will be so chosen and arranged as to break the monotony of a long trip. The hedges will not allow snow to pile up and to block traffic, because they will not be planted in a continuous line.

At various intervals on the grass strip in the middle of the highway, hedges will be planted at right angles to the direction of the road. These hedges will be slightly higher than the lights on the vehicles, so that the lights from automobiles moving toward each other will not blind the drivers. The arrangement of such hedges is especially important at curves, where the lights of the cars that are traveling in the inner lanes of the curve, shine directly into the windshield of the cars coming from the other direction. In addition to preventing the light from one side of the road distracting drivers on the other side, the hedges serve the purpose of outlining the direction of the road by reflecting the light of the individual autos. The main disadvantage of these hedges is that where the road falls and rises perceptibly the light shines over the hedges and thus defeats their purpose.



EXPRESS HIGHWAY SYSTEM planned under new law centralizes all German highways under a national authority.

In regions where there is particularly heavy snowfall, as in East Prussia and the Bavarian Mountains, the highways are built on embankments to prevent the snow from accumulating on them. In the mountains the roads will very often be one-way roads; that is, those ascending will be in a different location from those descending.

This will be done from the point of view that conditions favorable for driving upward differ from those favorable for driving downward. Furthermore, from the standpoint of landscape beauty, such an arrangement is very often the best.

Senator Puricelli of Milan, the guiding spirit behind the Italian street construction has made proposals for a European system of express highways 10,000 miles in length, and the German plans follow the international plan. Holland also has begun to construct express speedways in connection with the German system, and other countries of Europe are working on plans in the same direction.

Oxy-Acetylene Cutting of Structural Steel

Recommended practices applicable to the use of the cutting blowpipes in fabricating shops and in the field

THE widespread utilization of the oxy-acetylene cutting process on various types of construction and in fabricating and erecting all types of steel structures has brought about a need for recommended practices to insure its safe and proper use. Certain precautions are necessary in order to safeguard both the structure and the workmen, and these have been recognized in a set of recommendations drawn up by The Linde Air Products Co. and published in its magazine, *Oxy-Acetylene Tips*. These recommendations were prepared in cooperation with F. H. Frankland, director of engineering service, American Institute of Steel Construction. New York State Department of Labor regulations, National Safety Council Safe Practices Bulletin No. 23, the American Welding Society code and committee reports of the International Acetylene Association were also drawn upon in drafting the recommendations that are presented below. Such condensation of the original text as has been necessary has not eliminated essenti l data. In addition to the recommendations, there are included qualification tests for workmanship, safety precautions and suggestions on proper cutting practices.

Recommended practices

1. Those undertaking gas cutting within the scope of these recommendations shall demonstrate their ability to produce gas cuts of satisfactory quality.

2. The quality of gas cuts permitted shall in no case be lower than that required in Qualification Test No. 1 for full (unguided) manual cutting, and as required in Qualification Test No. 2 for guided manual cutting, as described below.

3. Gas cutting shall not be permitted in any member or part of erected structures embraced within these recommendations without the approval of a responsible architect, engineer or authorized building inspector.

4. Gas cutting shall not be permitted on any member while it is under load, except minor detail cutting.

5. Gas cutting of any member or part to form openings or to remove portions of flanges shall not be done unless the design provides therefore.

6. Gas cutting may be used to form bolt holes provided the holes are made uniformly smooth and the dimensions and alignment of the holes are equivalent to those required for punched holes.

7. Gas cutting may be used to form rivet holes, provided they conform to the dimension tolerances required for punched or drilled rivet holes.

8. Gas cutting may be used to remove rivets, provided in so doing the thickness of the base metal about the rivet is not reduced.

9. All interior terminals or ends of non-circular gas cuts and all interior meeting points or junctions of gas cuts shall be uniformly rounded to form smooth fillets having a radius of not less than 1 in.

10. Gas cutting in primary members shall be performed with the aid of a straight-edge or suitable guide whenever the continuous length of the cuts is greater than 3 in. measured in a straight line, or where the diameter of a hole to be cut exceeds 3 in. This restriction shall not apply to detail cutting about beam and girder copings and endings that provide insufficient clearance for proper field assembly, provided, however, that the requirements of ¶9 are fulfilled.

In evaluating gas cuts in plain low-carbon steel from the standpoint of their serviceability in structures, there are two points of principal concern. One deals with the accuracy of the cut, referred to predetermined dimensions, profiles or layouts; the other consists of the smoothness or regularity of the cut edge or surface. Accuracy in cutting, in turn, determines the accuracy with which steel members or parts can be fitted together or framed, whereas smoothness of cutting is a measure of the service that a cut can perform under load or stress. The qualification tests are planned to demonstrate the workman's ability to secure both accuracy and smoothness within reasonable limits.

Qualification Test No. 1— Full Free-Hand Manual Cutting

1. This test requires the cutting of two test specimens from ¼-in. low-carbon steel plate of structural grade, ½-in. wide by 12 in. long, as shown in Fig. 1 (*a*). The inside face only of these specimens is to be gas-cut, the outside face to be in the "as-rolled" condition, or machined smooth.

2. The method of cutting shall be fully manual—that is, no guides or straight-edges other than the cutter's hand are to be used. The cutting equipment shall be in good workmanlike condition, and the gas pressures employed shall conform closely to those specified by the manufacturers of the cutting blowpipe. The dimensional requirements for accuracy shall conform to the tolerances specified in Fig. 1 (*a*). The squareness of cut, cross-sectionally, shall be within 5 deg., or approximately 1/16 in. in ¼ in. when measured against

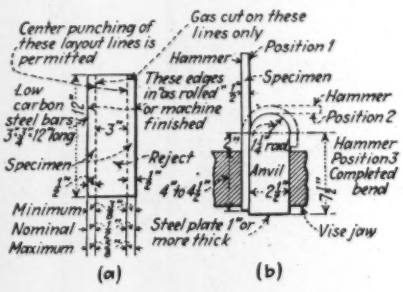


FIG. 1—FREE-HAND cutting qualification is determined by a test involving cutting to a line with ¼-in. total tolerance and then bending to a 1¼-in. radius.

the top surface of the metal being cut.

3. Upon completion of cutting, the specimens shall fall free of the base metal from which they were cut without the aid of a hammer or other tool, and the bottom edge of their cut faces shall be reasonably free of adhering slag. When cold, the specimens are to be cleaned of any adhering slag in preparation for bending, as shown in Fig. 1 (*b*). Under these conditions, the specimens are to be placed in a vise (Fig. 1 (*b*) position 1), and bent completely around a 1¼-in. radius anvil to position 3, of Fig. 1 (*b*) without cracking.

4. Small fractures at the extreme margin or edge of the cut surface shall not disqualify a specimen, since there is known to be a high concentration of stress along these margins under the bending conditions set forth, which is relieved as soon as small ruptures in these extreme fibers take place.

Qualification Test No. 2—Guided Manual Cutting

1. This test is similar to Test No. 1 with the exceptions noted. The required specimens are shown in Fig. 2.

2. The method of cutting shall be manual, but the cut shall be made with the aid of a suitable straight-edge guide clamped or otherwise secured to the base metal being cut. The dimensional requirement for accuracy shall conform to the tolerances specified in Fig. 2 (*a*). The squareness of cut cross-sectionally shall be within 2½ deg., or approximately 3/32 in. in ¾ in., when measured against the top surface of the metal cut.

3. The specimens are to be placed in a vise (Fig. 2 (*b*), position 1) and bent completely around a 1-in. radius anvil to position 3 of Fig. 2 (*b*) without cracking.

Safety precautions

As a safeguard against fires and accidents during building construction, repair and demolition, the following precautions shall be observed in the use of the gas-cutting process:

1. For gases under pressure: only cylinders that comply with Interstate Commerce Commission shipping-container specifications shall be used.

2. In the use or storage of charged cylinders, care shall be taken to prevent tampering by unauthorized persons or damage by falling objects.

3. Cylinders shall not be exposed to sparks or flames either from the welding or cutting operation or from any other source. Charged cylinders shall not be placed near boilers, furnaces or forges, or near readily flammable material.

4. Cylinders, when moved from one portion of a structure to another, shall be protected with such caps for valves as are required by the Interstate Commerce Commission specification unless securely mounted on a special truck or other suitable transporting device. Regulators shall be removed when the outfit is moved unless cylinders are securely mounted on such truck or other suitable transporting device.

5. Cylinders when in use shall be located reasonably close to the work in order to avoid undue lengths of hose.

6. Cylinders in use on structures shall be securely lashed in place when necessary to prevent them from falling to a lower level.

7. Each cylinder connected for use with a blowpipe or torch shall have an automatic regulator or reducing valve attached directly to the cylinder valve with or without an adaptor.

8. When cylinders are connected to cutting equipment but such equipment is not in use, the cylinder valves shall be shut and pressure released from the reducing or regulating valves.

9. Important warning — Oily or greasy substances shall be kept away from oxygen cylinders, cylinder valves, couplings, regulators, hose and all other oxygen apparatus.

10. Where cutting operations are progressing, proper precautions shall be taken to prevent metal or slag from falling on persons or on combustible material.

11. Suitable eye protection shall be used by the workmen actually employed in the cutting operations.

12. Cutting blowpipes or torches, regulating or reducing valves, pressure gages, acetylene generators (when permitted), hose and couplings shall be of a type listed as standard by Underwriters Laboratories, Inc., or by the Associated Factory Mutual Fire Insurance Companies.

13. Reserve stocks of oxygen shall not be stored alongside of reserve supplies of acetylene or other fuel-gas cylinders. If calcium carbide is stored on the premises, the current regulations of the National Board of Fire Underwriters relating thereto shall be followed.

14. Where acetylene generators are used, the current regulations of the National Board of Fire Underwriters as to the installation and operation of such generators shall be followed.

15. Handling cylinders:

a. Cylinders of compressed gas shall be handled carefully at all times.

b. When handling cylinders by a crane or derrick, a cradle, boat or suitable platform shall be used, but electric magnets or slings shall not be used.

c. Cylinders, whether charged or empty, shall not be used as rollers, skids or supports.

16. Storing cylinders:

a. Charged cylinders shall be stored in well-ventilated cool locations and away from elevators, other openings or gangways.

b. Charged cylinders shall not be stored where they are exposed to extremes of temperature.

c. Open lights or flames shall not be placed where charged cylinders are stored.

d. Valves on empty cylinders shall not be altered or repaired except by the manufacturer.

17. Care of cylinders and apparatus:

a. Tops of concave head cylinders shall not be used as receptacles for tools or other material. The valves shall be accessible for quick shut-off at all times.

b. The connection between the regulator and the cylinder valve shall be a gas-tight joint. If there is a leak, the gas shall be shut off at the cylinder before tightening the joint. Note—to make the test for leak, release pressure-adjusting screw in the regulator and open the cylinder valve slowly. Then test connection with soapy water or equivalent liquid. Never use a flame of any kind.

c. Equipment such as blowpipes, torches and regulating or reducing valves should be stored and taken care of when not in use.

d. When a new cylinder of compressed gas is connected to the apparatus, be sure to open the valves on the blowpipes or torches a sufficient time before lighting to purge hose of any mixtures that may be present.

e. If apparatus is found to be defective, the operator shall close the cylinder valves and then immediately notify the person in charge.

f. The hose connecting blowpipes to gas outlets shall be of sufficient strength to sustain a test pressure of at least 400 lb. per sq.in. maintained for 5 min. Armored hose shall not be used.

g. The connections between the hose and fittings shall be securely made with suitable clamps or ferrules.

h. Hose shall be so located or protected as to prevent accidental damage by trucks, wheelbarrows, etc. Hose shall be kept free from tangles and kinks.

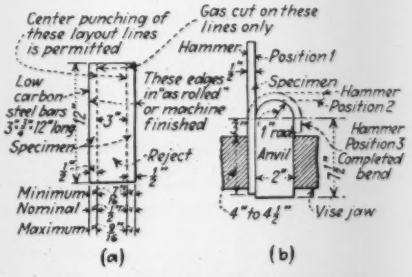


FIG. 2—GUIDED-HAND cutting qualification is determined by a test involving cutting to a line with 1/8-in. total tolerance and then bending to a 1-in. radius.

18. Special suggestions for acetylene cylinders:

a. Acetylene cylinders shall be stored and used with valve end up and shall not be allowed to lie on their sides.

b. Do not tamper with the fuse plugs or other fititngs which form parts of cylinders.

c. To get the full flow of gas from an acetylene cylinder, it is unnecessary to open the cylinder valves more than 1½ turns. Keep the valve key on the valve spindle or stem when the cylinder is in use.

d. On an acetylene cylinder the threads of the cylinder valve are generally left-handed. If the acetylene regulator does not fit the cylinder valve, a proper adaptor should be used.

19. Special suggestions for oxygen cylinders:

a. Warning: Keep oxygen away from oil or grease. Oil or grease in presence of oxygen under pressure will ignite violently.

b. Oxygen shall never be used as a substitute for compressed air or as a pressure-imposing medium.

c. Do not tamper with or attempt to repair oxygen valves.

d. Always operate oxygen cylinders with the valves wide open.

Cutting practices

1. Since cutting action is dependent upon the chemical reaction between the metal and the oxygen, it is desirable that the surface of a part to be cut should be cleaned before attempting to cut. Dirt and scale, if any, other than ordinary mill scale, should be scraped off or removed with a stiff wire brush. Heavy layers of paint tend to slow down the cut and annoy the operator by fuming.

2. Clean and workmanlike cutting is greatly facilitated when the proper size blowpipe nozzle and oxygen pressures are observed. The following table provides a guide for cutting the normal range of thicknesses encountered in average structures:

Thickness of Metal, In.	*Size of Cutting Nozzle, No.	Oxygen Pressure, Lb. per Sq.In
¼	1	20
⅜	1	25
½	1	30
¾	2	35
1	2	40
1¼	2	45
2	2	45
3	2	55
4	3	65

*Nozzle sizes are those for Oxweld cutting blow pipes.

3. For fully-manual cutting, accuracy is improved by center-punching the line of cut at close intervals. This aids the cutting operator in recognizing the line of cut more easily.

4. In cutting through flange and web junctions of beams, girders and columns, better results as to regularity of cut will generally obtain if a small round port or hole is first cut through the web on the desired line of cut as close as possible to the inside face of the flange. This serves to exhaust the cutting oxygen and products of combustion uniformly when passing these junction points as a cut progresses across a flange.

5. Beam-and-girder flanges should never be cut between supports unless especially provided for in the design of the beam or girder. Flanges may be trimmed or coped in the vicinity of supports without endangering the beam or girder, provided the beam or girder is otherwise suitably connected to the column or member in which it frames.

6. Holes or openings should never be cut in beams, girders or columns unless the design therefor specifically provides for these openings; if permissible, or in designing therefor, they should preferably be located in the middle section of the web.

California Makes Progress Against Earthquake Hazard

Since the Long Beach earthquake last year more enlightened views on seismic risk have been adopted, including new laws, new ordinances, statewide checking of public school buildings and advisory committees on resistant design

By N. A. Bowers
Pacific Coast Editor, Engineering News-Record

AFTER YEARS of alternate agitation and lethargy concerning the problems of public safety attendant on possible seismic disturbances, California has finally faced the problem squarely, and there is evidence that progress will be both constructive and continuing. The public is now demanding earthquake safety in building construction, and because this fact has an important bearing on engineering design and construction the situation warrants review.

Structural engineers of California have long recognized and appreciated the importance of earthquake-resistant construction, and their attention has been re-focused on this problem, sometimes none too gently, by actual demonstrations beginning with the seismic disturbances in 1857 and 1872, followed by the recent reminders of 1906 at San Francisco, 1925 at Santa Barbara and 1933 at Long Beach. However, the general public, unlike engineers, was inclined to overlook and forget these lessons quickly. It disliked to admit that earthquakes occurred in California at all and was tempted to cut building costs by minimizing or altogether omitting provision for lateral forces. The latter tendency is chargeable largely to building construction speculators, operating on the policy of "build to sell."

1906 quake soon forgotten

All three of these tendencies were reflected in the changes made in the San Francisco building ordinance after the 1906 earthquake. Analyses of buildings that were wrecked in that disaster and others that withstood it indicated that structures designed for a lateral force of 30 lb. per sq.ft. would be sufficiently resistant to lateral force to provide safety to occupants. While destruction of the city was still fresh in mind, the counsel of engineers prevailed, and a clause requiring provision for a horizontal force of 30 lb. per sq.ft. described as "wind load" (note that earthquakes were not mentioned officially) was inserted in the city's building ordinance.

But this did not last long. Soon the requirement was reduced to 20 lb., later to 15; and only three years after the 1906 earthquake, despite the protests of engineers, *all "wind load" requirements were eliminated* from the San Francisco ordinance for structures less than ten stories in height, or 102 ft. (*ENR*, April 28, 1927, p. 667). Meantime floor-load requirements also had been reduced from 60 to 40 lb., and higher unit stresses in steel had been adopted. In short, the safety margin had been decreased all around.

Not only was there public apathy throughout the state, but there were architects whose ambition to build ornate facades cheaply exceeded their concern for public safety in time of earthquakes. Also, there were building contractors whose sole concern was to meet specifications—specifications in which quakes were not considered.

The result of all this is history, written in the reports of the southern California earthquake of March 10, 1933. In that earthquake between 35 and 40 school plants in Long Beach were wrecked completely. *It has been estimated that if the shocks had come during school hours not less than 10,000 school children would have been killed.* It just happened that these deaths did not occur—no thanks to the means of prevention which engineers know how to use but which they had been kept from applying by the public's three-fold complex already mentioned — apathy,

aversion to frankness and the "build-for-profit" motive.

Changing attitude

If that condition still obtained, this article would not be written, for engineers have heard the story of public indifference to periodic irritations oft-times before. But a new day has come. Progress is set to a faster tempo, and in the year since the Long Beach disaster there has developed throughout the state a new and more enlightened attitude toward the whole subject of earthquakes. Earthquake-resistant design, considered "too costly" before the Long Beach disaster, is now required by state law; throughout the state old school buildings are being examined and many are being condemned; instead of being dimmed by the fog of public apathy that usually closes down again a few months after a disaster, this time the vision has remained clear; and now, more than a year after the earthquake, progress is under way in a dozen lines looking to safer construction.

An early instance of this changed attitude was the official pronouncement from the president of the Los Angeles Chamber of Commerce (foreword to the Millikan report, June 6, 1933), which states: "Southern California is no different from other sections of the United States or the world with respect to conditions of hazard, for other areas have their floods, tornadoes, hurricanes, storms and even earthquakes, and they can be justly criticized when they, like ourselves, sit idly by and fail to recognize that unless known protective measures are taken, such natural hazards may cause certain damage that otherwise might reasonably be avoided."

The following items of recent current activity reflect the new statewide attitude that has developed since the Long Beach earthquake:

1. Field and Riley Acts passed—two state laws making earthquake-resistant construction compulsory.

2. Several cities have adopted and others contemplate adopting new building ordinances with earthquake-resistant requirements.

3. An advisory committee of engineers appointed by the state to aid in interpreting and applying the Field Act.

4. Inspection of school buildings to check up on their safety in earthquakes is going on throughout the state.

5. Forty schools in Long Beach have been reconstructed promptly with full regard for earthquake hazards.

6. Los Angeles school board vigorously criticized for delay in rebuilding damaged schools.

7. Activity looking to completion of California's uniform building code has been renewed.

8. Structural Engineers Association held a series of meetings to aid in interpretation of Field Act.

9. Engineering societies promote earthquake-resistant construction through advisory committees.

10. Annual meeting of Seismological Society of America deals with building safety.

11. Coast & Geodetic Survey carries on an extensive seismic survey in California, with $40,000 additional appropriation allotted in April.

12. A survey of 540 buildings in downtown San Francisco having shown that 75 per cent have earthquake hazards, their defects are to be remedied.

Steps in this progress

Details of some of these steps of progress are instructive, as showing the breadth of the new sentiment and its relation to constructive engineering thought.

The Field and Riley Acts, passed by the California Legislature after the Long Beach earthquake, were framed to require earthquake-resistant provision in the design of new buildings throughout the state.

The Riley Bill provides that all structures for human occupancy within incorporated cities of the state, except one- and two-family dwellings, shall be designed for a stipulated seismic factor—that is, in the language of the bill, they "shall be designed and constructed to resist and withstand horizontal forces from any direction of not less than either 2 per cent of the total vertical design load or 20 lb. per sq.ft. wind pressure on the vertical projection of the exposed surface, the horizontal force used to be the one that produces the greater stresses in the building." In designing for stresses introduced by the seismic factor, the act permits figuring unit stresses in material 33⅓ per cent in excess of usual working stresses for vertical loads.

The Field Bill was framed to safeguard construction of all publicly owned school buildings and puts responsibility on the division of architecture for the regulation and approval of plans for such construction. Acting under this authority, the division of architecture has adopted the provision of the uniform building code, which requires that a seismic factor of 10 per cent shall be used in all wall-bearing masonry buildings, and that in all other buildings the seismic factor shall be from 2 to 5 per cent, the variation being in accordance with foundation material. Where the soil-bearing capacity is 4 tons per sq.ft., the seismic factor is to be at least 2 per cent; where it is 1 ton per sq.ft., at least 5 per cent. In applying the foregoing requirements it is permissible to use unit stresses in materials 33⅓ per cent in excess of usual working stresses. The law requires that all plans for school buildings be signed by a certified architect or structural engineer, and that the same individual must certify on completion of the work that construction has been in accord with the plans. Violation is made a felony.

Both these new laws were passed as emergency measures and hence became effective immediately. In stating the nature of the emergency the following was written into the statutes: "The series of earthquakes occurring in the southern portion of the state has caused great loss of life and damage to property. Much of this loss and damage could have been avoided if the buildings and other structures had been properly constructed. The buildings that will be constructed and reconstructed to replace the buildings damaged or destroyed by earthquake should be so constructed as to resist, in so far as is possible, future earthquakes."

Revised building ordinances

New building ordinances have been under consideration in many California cities in recent months. San Francisco is still working on the sections covering earthquake-resistant provisions. Los Angeles recently put into effect an amendment to its building code, which requires that all new buildings be designed with a seismic factor of at least 8 per cent; but certain types of buildings (schools, theaters, churches and other places of public assembly) may be designed with a higher seismic factor, ordinarily 10 per cent. Provision is made for special risks in numerous items, such as elevated tanks, cornices, parapets, etc., with correspondingly higher seismic factors, ranging up to 100 per cent in the case of parapets. The one exception to the 8 per cent minimum is in buildings that have a flexible first story; in such buildings a 4 per cent seismic factor is permitted above the flexible story. All of these provisions include allowance of a one-third increase in unit stresses on materials.

California cities which recently have adopted ordinance provisions for resisting lateral forces include:

	Minimum Seismic Factor* Per Cent
Santa Monica	7½
Los Angeles	8
Beverly Hills	8
Long Beach	8
Pasadena	10

*The seismic factor designates the allowance for forces that might be caused by an earthquake. It is a percentage of the total vertical design load, considered as applied horizontally from any direction.

Two advisory committees have been appointed by the director of the state department of public works to aid the division of architecture in interpreting the earthquake-resistant provisions of the Field law. One committee includes three structural engineers from the southern part of the state and three from the north, while the other consists of six architects similarly divided. To these committees are referred special cases which the division feels require technical analysis in order that the law may be administered fairly or which

have to be arbitrated before an executive board.

School inspection

Inspection of school buildings in many parts of the state by competent engineers was instituted by civic bodies soon after the Long Beach disaster. In that catastrophe scores of school entrances had been piled many feet deep with the débris from wall ornaments and decorative work above, an occurrence that made deep and lasting impression on the public and brought out vigorous demands for safety in school construction. The public sentiment has continued so strong that public officials dare not overlook nor disregard it, and architects and builders no longer will be allowed to sacrifice safe construction for unsafe ornamental and decorative features.

With this new responsibility impressed upon school boards, not only new buildings but schools now in service have come under scrutiny. In recent months structural engineers were engaged by San Francisco to report on 19 of the oldest schools in the city; all of these were found to present serious hazards, and 18 were in such condition that they were closed immediately. In Berkeley, out of 21 schools examined 18 were closed. In some cities, approved school buildings have capacity enough, by holding double sessions, to accommodate pupils from closed schools, while in other cities classes are being held in tents or other emergency quarters.

Serious conditions were found in many cities. In fact, about 90 per cent of the schools that were examined in the year after the Long Beach quake proved to contain serious seismic risks. Extensive inspections of schools now in service have been made in Berkeley, Oakland, Alameda, Pasadena, Palo Alto and other cities. A few cities have taken the attitude that they are not interested on the ground that because of their location they do not expect quakes to occur.

Long Beach school reconstruction was undertaken promptly, and a creditable record has been made in the past year. The 1933 earthquake wrecked the schools in that city so completely that little more than foundation work remained available for use in reconstruction. The 40 school plants as reconstructed will rate only about 6 per cent of their value after reconstruction as salvage from the previous buildings. Thus, Long Beach has set a high standard for other communities in providing more than $6,000,000 worth of schools, structures of a type designed with regard for seismic risk.

The Los Angeles school board, on the contrary, recently has been the target for vigorous criticism by citizens of that city because a whole year has elapsed without definite settlement on the general policy of reconstruction. For some months after the earthquake Los Angeles school sessions continued as previously. Then, subsequent to a legal decision putting responsibility squarely up to the school board, many of the schools were closed. The reaction among parents was that there had been only a belated awakening of civic officials to the danger to which school children had been subjected daily.

A proposed $20,000,000 school bond issue in Los Angeles failed to carry on March 20, 1934. One reason for the failure was the popular belief that the school board had not classified the damaged school buildings and settled on a definite policy of reconstruction as to what should be discarded and what retained, what percentage of damage would justify complete reconstruction and what the policy should be as to type of new buildings and materials of construction. The long delay weakened public confidence in that city, and there has been widespread discussion of some entirely new policy. One faction of citizens advocates school buildings of light or even temporary construction, as a relatively safe and inexpensive means for emergency continuation of the educational program. Others point out that "School building matters should never be settled on a basis of materials to be used but rather on the basis of a safe and economical design for the necessary facilities."

The people of Los Angeles are unmistakably aroused; they are in no mood to brook any irregularities, and they want safety for their children. If there is to be a squabble over materials, if there is any further risk of spending money for elaborate ornate structures that constitute hazards and increase building costs at the expense of funds for the real educational work—in short, if the present system in school construction is unsatisfactory—why not meet the emergency, they say, with some safe, *temporary* structures and not rush into any heavy expenditure until a better solution of the whole problem is offered?

Perhaps the Los Angeles school situation will soon have been worked out satisfactorily. Its status a year after the earthquake is worthy of mention, however, because at the present writing it is a significant part in the new picture of a popular demand for a more enlightened viewpoint and a progressive policy on earthquake-resistant construction.

Building codes and society action

The uniform building code for use throughout the state is the objective of a joint committee organized some six years ago, consisting of representatives of the American Society of Civil Engineers, the American Institute of Architects, the Associated General Contractors, and the Building Officials Conference of the Pacific Coast. This committee was organized to develop a code that would be as nearly ideal as possible in getting reasonable protection against earthquakes for the minimum additional cost in structural design. Underwritten by the State Chamber of Commerce to the extent of almost $40,000, this committee did exhaustive work, meeting alternately in San Francisco and Los Angeles; and, although there have been many obstacles to cause delay, the recently increased interest on the part of the public has helped. The prospect now is that the code can be completed in the near future.

This work is comprehensive in scope and will constitute perhaps one of the most extensive compilations ever put together in building-code form. The buildings considered are grouped in several classifications, and a complete index is included. Careful attention is devoted to materials of construction—there is a chapter on timber and others on brick, concrete, steel, etc. The limitations on brickwork, on column sizes and special structures, such as theaters and churches, all are discussed.

It was thought desirable to arrange the terms of this code in specification form to a certain extent so that sentences, paragraphs or entire divisions may be lifted bodily and inserted in specifications just as they are phrased. In fact, since the code has been made public to a limited extent, parts of it already have been adopted by various cities or departments, as in the case of the division of architecture's regulations under the Field Act. It is believed that the availability of such a code will result in its widespread adoption and will make for greatly improved standards of construction with respect to seismic risks. This, in turn, will bring about a reduction in earthquake insurance rates. Reference to the formation of the uniform building code committee appeared in *ENR*, April 26, 1928, p. 678.

A series of meetings has been held semi-monthly by the Structural Engineers Association of Northern California to discuss problems of earthquake-resistant construction in general and particularly interpretation by the division of architecture of the new Field Act.

Sections of the American Society of Civil Engineers have been active both in Los Angeles and San Francisco in meetings and through committees. A recent meeting of the San Francisco Section resulted in the appointment of a committee of seven to advise "if, when and how the section constructively can act in the matter of regulations regarding earthquake-resistant construction, both state and municipal, which already have been, or henceforth may be, enacted or whose enactment or repeal may be desirable. In other words, a committee that will point the way to constructive action by this section on regulatory provisions that are and properly should be the concern of civil engineers in California."

The Seismological Society of America at its recent annual meeting in Berkeley devoted one day to a series of nine papers on practical aspects of making buildings safer during earthquakes. Thus, the seismologists left the purely theoretical field long enough to interpret their views and their findings in decidedly practical manner, endeavoring to contribute their share in the popular move toward earthquake-resistant construction.

The U. S. Coast & Geodetic Survey, which has been carrying on extensive seismic studies in California, recently has received an additional appropriation of $40,000 for work in that state. By use of strong-motion accelerographs and displacement meters located in buildings of various types in different cities, data are being collected for making more accurate analyses of earthquake effects on structures. Studies and instrument work include the search for the dominant period in the ground in different districts and for varying foundation conditions, the idea being that if such periods can be ascertained it would be possible to avoid the design of buildings whose periods would be in resonance with the ground and hence particularly subject to severe earthquake effects. Part of the work is an exhaustive survey of building periodicity and the determination of whether the same period holds throughout the structure or whether, in high buildings, it varies from roof to foundation.

Port Reorganization Problems Found Critical in England

Decline in shipping, varied forms of port ownership, excessive port capacity, obsolescence of small ports, lack of uniformity in rates and charges combine to complicate economic conditions

MULTIPLICITY of ports as an economic problem involving factors of engineering and finance is discussed in a paper presented recently before the British Institute of Transport by Frank Brown, assistant general manager of the Port of Bristol Authority. In this paper it is pointed out that with increasing size of ships many ports have had to make heavy expenditures in building larger docks and providing modern equipment, while obsolescence and rehabilitation are serious matters at many of the smaller ports having out-of-date facilities and equipment.

More than $1,200,000,000 of capital is invested in docks, for which interest and maintenance costs must be provided, but many ports have suffered a decline in trade, and the present general decline in overseas shipping is likely to continue. When trade was at its peak in 1931, the potential capacity of the ports for loading and discharging cargoes was in excess of the volume of business. Since then more docks have been built and new equipment provided. Today the port capacity is much greater than in 1913, yet the maritime trade has declined. In Mr. Brown's opinion, further increase in capital expenditure (except in some special cases) is not in the public interest. Although a small country, Great Britain has fifteen to twenty first-class ports and several hundred smaller places.

Port ownership

The form of ownership of British ports varies greatly. Of 330 docks and harbors considered in the report of the Royal Commission on Transport, 1931, the ownership was classified as follows: (1) local commissions or trusts, not operated for profit, 110; (2) harbor companies, 100; municipal authorities, 70; railway companies, 50. These variations are evidenced by extreme differences in facilities, dock dues and charges and labor costs, while there is a specially serious problem in the railway docks, which are supported almost entirely out of railway revenue.

Railway ownership was considered undesirable in principle by the commission, on the ground that one form of transport should not own docks and harbors to which access by other means of transport is essential. On the other hand, some of these ports are little more than transfer stations between rail and boat, so that on the whole the commission was of the opinion that for existing railway ports this type of ownership should not be changed.

In general, the commission considered that the best kind of ownership is by a public trust.

Grouping of ports

As a step in reorganization, the commission suggested that such public port trusts should not be confined to single ports but should control all ports in certain districts. Grouping of facilities as a unit at large ports Mr. Brown illustrates by the case of London, where a port authority was established in 1908, after a long history of "internal competition accompanied by confusion, strife and comparative inefficiency amongst the separate dock owners (naturally resulting in common adversity)."

But Mr. Brown considers that grouping of ports would be difficult to effect by agreement, owing to local interests and local pride. Such a change would have to come as a matter of national expediency, conceived along the same lines as the railway amalgamation in 1921, by which some 60 individual railways were combined into four systems with four owning and operating companies. Transfer of all docks to railway ownership is undesirable and out of the question, in Mr. Brown's opinion.

Port reorganization

While the reorganization of ports is an urgent problem, it is only a part of the larger problem of transport development. In view of railway amalgamation and the more recent step (1933) of control and regulation of highway traffic in England for the public interests, it is considered evident that conditions are moving toward a change in matters of port ownership and administration. Such a change should be made slowly, since disturbances and diversions of channels of trade would be harmful to local interests.

Furthermore, the port community is dependent largely upon the port's activities, and it is essential to preserve the initiative due to local pride and equitable forms of competition. For this reason the local community should assume both an interest and a responsibility in the port undertaking. The principle, says Mr. Brown, is expressed in its most complete form where, as at Bristol, the whole of the dock's expenditure forms part of the ordinary loan capital of the city corporation. At London, Liverpool, Manchester and Glasgow the local communities have an important share, but capital has been provided also by merchants, manufacturers, ship owners and the general public.

No definite solution of the problem of port economics is suggested in Mr. Brown's paper, but he considers that the subject, with its present conditions and its future prospects is sufficiently important to warrant the appointment of a government commission for an investigation whose main objectives would be as follows: (1) coordination of port activities so as to minimize conflicting services; (2) encouragement of traffic to flow along natural channels, so far as other economic factors permit; (3) discouragement of competition that is merely diversion of trade without public advantage; (4) better provision for the amortization of capital represented by obsolete or obsolescent accommodations and facilities; (5) simplification of dues on ships and freight and charges for cargo handling; (6) elimination of local practices which are restrictive and result in low efficiency and economy; (7) development of incentive and enterprise on the part of local interests.

Specifications and Tests Reviewed by A.S.T.M.—I

Annual meeting last week handled 174 actions relating to standards and methods of test for iron and steel, cement and concrete, brick, timber, bituminous materials and soils—Sulphate-resisting cement specifications proposed

THE ANNUAL MEETING of the American Society for Testing Materials, held June 25-29 in Atlantic City, N. J., was characterized by the usual intense committee activity and by a program of papers planned to appeal to the widely varied interests of the members. An index of accomplishment is contained in the 174 actions relating to standards and tentative standards that were handled at the meeting. Significant developments included the promulgation of a new specification for a sulphate-resisting cement, the introduction of soils to the list of materials studied by the society, the adoption, as standard, of the present tentative specifications for structural steel for bridges, buildings and mild steel plate, respectively. Among the important papers, a notable one was by H. F. Gonnerman of the Portland Cement Association on a study of cement composition in relation to strength, length change, resistance to sulphate waters and to freezing and thawing of mortars and concrete.

The annual Marburg lecture, given this year by Sheppard T. Powell, consulting engineer, Baltimore, was on the subject of "Water as an Engineering and Industrial Material." R. L. Templin, chief engineer of tests, Aluminum Company of America, was awarded the Dudley Medal for his paper at last year's meeting on "The Fatigue Properties of Light Metals and Alloys." William H. Bassett, metallurgical manager American Brass Co., was elected president to succeed Prof. T. R. Lawson of Rensselaer Polytechnic Institute. Next year's meeting will be held in Detroit in the last week of June and will be accompanied by an exhibit of testing equipment and materials.

From almost any viewpoint—membership, finances or standardization work—the A.S.T.M. has improved over last year. The membership as of June 1, 1934, was 3,569, a net decrease of 164. This decrease, however, compares with one of 430 last year. There have been 254 new members added this year as compared with 170 last, and resignations have been 163 as compared with 382. Standardization work has progressed until there are a total of 718 A.S.T.M. standards of various kinds, 28 new ones having been added at the meeting.

In his address as retiring president, Professor Lawson called attention to the probable need of A.S.T.M. specifications in connection with NRA code operations. He pointed out that the society had a 1934 job to do with a 1924 membership and a 1927 income and particularly urged the membership to support any plan to increase the research fund of the society.

Committee reports

The reports of the administrative committees on standards, research and methods of test contained some items of note and general interest.

The submission of proposed new standards to the standards committee (E-10) for consideration and approval between annual meetings has worked well. In addition, a new procedure has been inaugurated through which proposed specifications or methods may be published in the society *Bulletin* or trade journals as information only, before any official cognizance is taken of them. Expansion of standardization activities has been reflected in several new studies—for example, zeolite for water softening and asphalt plank. The subject of testing methods for soils for road subgrades has also been taken up, with the possibility later that soil studies in general may be recognized by the society. Committee E-10 acted favorably upon 25 specifications (19 new ones and 6 revisions) in one way or another during the year, according to Cloyd F. Chapman, chairman.

The committee on research (H. F. Moore, chairman) reported on the list of projects under way. Consideration is being given to preparing a report on the significance of the yield point of structural steel. The studies of the effect of phosphorus and sulphur in structural steels have been completed, and a further program is under consideration.

The committee on methods of test (W. H. Fulweiler, chairman) reported that the section on compression testing is interesting itself in a determination of the importance of speed of test, that a new section on flexure testing has been organized, that the section on impact testing is completing a survey of the various fields in which impact tests have proved useful, and that the section on consistency has reached an agreement on a definition of consistency and plasticity and is now working on methods of measuring these characteristics that will be in keeping with the definitions; it is the hope that it may be possible to express, in the same absolute units, the consistency of all materials that flow.

Water analysis

The subject of the annual Marburg Lecture was unique, as compared with the subjects discussed previously in the eight lectures given since the event was inaugurated. The subject of water was justified by the lecturer, Sheppard T. Powell, of Baltimore, by pointing out that the proper use of water required definite specification writing and specific test methods the same as any engineering material.

Mr. Powell emphasized the deleterious effect of certain minerals in water, such as lead, fluorides, zinc, nickel, silver, manganese, etc., both on health and on industrial processes using the water. Routine water analysis is not precise enough to detect the presence of these minerals, and new methods must be developed. By and large these new methods are the responsibility of private industrial management, since public water supplies obviously cannot be treated for anything more than sanitary and health requirements.

The problem of boiler scale resulting from mineral deposition was chosen by Mr. Powell to illustrate what is being done in advancing the art of water analysis, to the end that the mineral content of water may be determined more accurately and steps taken to rectify dangerous conditions. The trend toward high temperatures and pressures in steam-generating plants has increased boiler-scale troubles, many salts becoming less soluble at high temperatures. The fact that these salts are deposited at high temperatures and pressures suggested a similarity to geological formation of sedimentary and igneous rocks, and led to the development of a petrographic method of analysis in which the identification of a mineral by the shape, color, index of refraction, etc., of its crystals is accomplished through microscopic examination of thin sections (0.03 mm.) of boiler scale in plane polarized light. The use of this method has revealed crystalline forms that previously defied identification.

Another method of mineral identification is by spectrographic analysis in which light radiated from a mineral is studied on a photographic plate. The plate can be compared with reference spectrums and the identity of a mineral established.

Polarographic analysis is a third method used. It is an electro-chemical procedure and is said to hold great promise.

Steel

Two committee reports were included in the program on steel. The most im-

portant development was the adoption as standard (subject to letter ballot) of the three tentative specifications of steel for bridges, for buildings and for mild steel plate, respectively. The first two cover a 60,000-72,000-lb. steel and supersede the old standards for a 55,000-60,000-lb. grade. The mild-steel-plate specification involves a steel with a 55,000-60,000-lb. ultimate. Another development was the report of a speecial committee on consolidation of rivet specification, which found that there was no possibility at present of reducing the three grades of rivet steel to two as had been hoped. The tentative revisions made last year in the standard specification for cold-drawn wire for concrete reinforcing, relating to yield point, were adopted as standard. Committee A-1 on steel rejected a proposal of its subcommittee on steel for welding that the American Welding Society's specification for filler metal be approved, with some modifications, as a tentative A.S.T.M. specification; the filler-metal specification was held to be a performance specification only and, therefore not eligible for consideration as an A.S.T.M. standard.

Previous reports by the committee on phosphor and sulphur in steels have been concerned with sulphur in rivets and structural shapes. This year's reports related to sulphur in forging steels and to the effect of added phosphorus on low-carbon steel. The latter is encountered in commerical practice in rephosphorizing in the manufacture of welded steel pipe. Four 95-ton heats of steel were involved in the study, phosporous varying from 0.007 to 0.08 per cent. Tensile and shearing strengths increased, percentage of elongation decreased with increased phosphorous. Inconsistency was noted in the impact tests, so that no relationship to increased phosphorus content could be established. The inconsistency was less for specimens cut transversely to rolling (as used in pipe) than for those cut longitudinally.

In a paper reporting a study of the effect of size and shape of steel test specimens by Inge Lyse and C. C. Keyser (Lehigh University) further data were given corroborating previous investigations, to the effect that tensile strength and Johnson's proportional limit (the stress at which the rate of deformation is 50 per cent greater than the initial rate of deformation) are not affected. The 114 specimens tested varied from ¼- to 1-in. diameter bars and from ¼x¼ to 1x4-in. rectangular sections. Elongation in 2 in. increased with size of specimen, while reduction of area decreased with increase in the width-thickness ratio of rectangular sections and remained nearly constant for all circular bars. In discussion R. L. Templin pointed out that the same relationships hold for all wrought metals that are not strain hardened.

An important part of the wrought iron committee's report was a dissertation on quality standards prepared by the subcommittee on research. In it, physical properties, chemicals analyses and structural characteristics typical of good quality wrought iron are presented for the information of users. The tentative specification for riveted steel and wrought iron pipe was advanced to standard, and a new tentative specification for wrought iron plate was presented in which provision is made for eliminating poor quality wrought iron and for recognizing that better transverse physical properties can be obtained by proper rolling.

Fatigue of metals

The committee on fatigue (H. F. Moore, chairman) reported plans for drafting a statement of recommended practice for rotating beam tests, although expressing at the same time its doubt whether standardization of methods has any value at present, first because it may hinder research, and second because it is not certain that the fatigue test has any great future as a test for acceptance or rejection of metal. In cooperation with the committee on metallography an atempt is being made to study the relations between metallographic and X-ray structures on the one hand and fatigue specimens on the other.

A new high-speed fatigue-testing machine was described by G. N. Krause (University of Illinois) in which an air turbine is directly connected to a conventional rotating-cantilever-beam type of machine. A pressure of 10 lb. per sq.in. operates the machine at 10,000 r.p.m., while 40 lb. gives a speed of 30,000 r.p.m. Within this speed range, it has been found that even considerable variation in speed has little effect upon test results. Also, check tests made with the slower-speed rotating-beam machine (1,500 r.p.m.) show that the speed effect may be accurately estimated and is of small import compared with the effect of surface finish. Specimens used with the new machine are relatively inexpensive.

Corrosion of iron and steel

Studies of corrosion of iron and steel were revealed by progress reports of the numerous subcommittees of the main committee. Results of periodic inspection on coated sheets at Annapolis, and of the total immersion of sheets at various locations, were given, but no conclusions were drawn. One subcommittee is developing a method for determining the weight of electro-deposited coatings but had nothing definite to offer as yet. It was reported by another committee that no embrittlement of cold-worked bars in the form of pole harware has been found, provided the steel was a good quality open-hearth product. The subcommittee on field tests of metallic coatings, whose specimens have had seven years of exposure, presented a summary of tests at Altoona, Pa., where all galvanized sheets have rusted. The conclusion was stated that the time for first local failure depends on both the weight and uniformity of the coating and not the composition of the base metal. The committee presented data to show the per cent of area covered by rust at stated periods as well as the time when rust first appeared. Electro-deposited coatings made up of a combination of copper, chromium and nickel placed on steel in industrial locations have failed badly after two years of exposure. Zinc and cadmium coating have shown up better.

Since 1922, the Bureau of Standards and cooperating public utility organizations, pipe and coating manufacturers and trade associations have spent about $400,000 in studying the effect of soil action on nearly 30,000 pipe specimens, of which about two-thirds have been removed and examined. K. H. Logan (Bureau of Standards) presented a paper outlining the extent to which the data so far collected can be applied to practice. Admittedly the present results are not directly useful in the field, but the investigation has served to show that stray electric currents are not the only cause of corrosion and that the type of soil has more effect than the metal used in the pipe. Also, the data point the direction to the proper solution of the problem, which involves among its most important requirements a qualitative knowledge of the various bituminous coatings. Also, more knowledge must be acquired concerning the life of unprotected pipe. Finally, some agreement must be reached as to whether the coating is applied as a means of preventing corrosive soil solutions from reaching the pipe or merely as a temporary means of protection until soil settlement around the pipe shall have produced uniform oxygen distribution and therefore (according to theory) less corrosive conditions.

The meeting voted to urge the executive committee of the A.S.T.M. to ask the federal government for funds to continue and expand the Bureau of Standards' work, on the ground that it was entirely in the public interest that the losses from pipe corrosion be reduced.

A paper allied to corrosion, prepared by M. C. Schwartz and W. B. Gurney (Louisiana Steam Generating Corp.), presented a modification of the Winkler method for determining dissolved oxygen in water by which a small known amount of iodine (in the form of potassium bi-iodate solution) is added to two samples, one of which contains no oxygen. Comparison of the reactions to a starch solution permits dissolved oxygen determination.

* * *

The second half of this report, covering road materials, cement, brick and concrete, will be published next week.

ENGINEERING NEWS-RECORD

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Off to a Fast Start

IMMEDIATELY following the signing of the Deficiency Appropriations Act by the President, the Public Works Administration began making allotments of the $500,000,000 provided for its work under that act. By the end of last week more than $200,000,000 had been allotted, principally to 1,241 non-federal projects. Secretary Ickes, Administrator of the PWA, has announced that the PWA will continue to make allotments as quickly as possible until the whole amount has been assigned. Just such prompt action is needed to make the public-works fund most productive as a stimulant to business. The construction season is still young; if the communities that receive allotments act as promptly as has the PWA board in making the allotments and if the PWA's legal department is kept from being unnecessarily meticulous in drawing up loan contracts, much of the $500,000,000 should be converted into construction contracts, into orders for material and equipment and into jobs by midsummer.

Speed Wanted by the PWA

THE PUBLIC WORKS ADMINISTRATION has no intention of letting the grass grow under its feet this summer for lack of action on other projects financed through the original fund. It has warned nearly 600 recipients of allotments that unless work covered by the allotments is put under construction promptly the allotment will be rescinded so that the money can be made available to other communities waiting for PWA funds. Many of the delayed projects are now believed to be out of the running because of the failure of bond elections or for lack of necessary legislative action. The amount involved is about $160,000,000. Added to the $500,000,000 made immediately available to the PWA under the Deficiency Appropriations Act this money should make it possible to get a large number of PWA projects under way early in the summer, especially if Secretary Ickes is correct in his prediction that many communities will ask only for the federal grant of 30 per cent of the cost of labor and material. Additional funds may become available at a later date as a result of the authorization contained in the Deficiency Appropriations Act for the purchase by the RFC of bonds held by the PWA up to an amount of $250,000,000. Thus close to one billion dollars should be available for PWA projects this summer.

Lumber Prices Cut

CUTS APPROXIMATING 10 PER CENT have been ordered on lumber and other products handled by the National Retail Lumber Dealers Association. This action has been taken in connection with the passage of the Housing Act in the hope that it will stimulate early resort to the provisions of the act for the financing of new house construction and remodeling, thus increasing the direct return to the dealers through a much larger turnover of stock. Recently the President expressed the hope that similar action would be taken simultaneously by all suppliers of materials of construction, by construction labor and by capital. However, such simultaneous action appears improbable as the sale of few other materials that go into houses is so well organized as is the sale of lumber products; organized labor repeatedly has expressed its opposition to such cuts, and capital finds little encouragement to cut interest rates when it compares the rates at which the government lends money, to the railroad for example, with the rates at which the government borrows money. Nevertheless, the lumber price cut should be a help psychologically in stimulating house construction because, to the layman, lumber stands out as the principal item going into a house. The National Retail Lumber Dealers Association, therefore, is to be congratulated upon its action.

Price Deflation

ANOTHER RECENT DEVELOPMENT that may affect construction costs materially is the President's executive order of June 29 permitting bidders for government contracts for goods and services to submit bids as much as 15 per cent below the price filed in accordance with the NRA code under which the bidder operates. The price thus bid then becomes his open market price and stands for the benefit of the public generally unless the NRA Administrator finds it to be destructive price cutting. The President's action is said to have been prompted by Administrator Ickes as the result of identical bids received on cement and other materials purchased by the federal government for the public-works program. It is too early to say how much this order will affect construction prices. It might have a demoralizing effect on prices, for after the cut price has been published it is possible for a bidder to make another cut below the newly published price if additional government contracts are put up for bid. On the other hand any cutting that may occur could be confined closely to government work through the expedient of immediately filing a new higher price with the code authority to offset the cut made to get the government work.

Improvement

INDIVIDUAL ENGINEERS will give various answers to President Roosevelt's rhetorical radio question, "Are you better off?" Engineering societies, on the other hand, can almost without exception respond with "Aye." The annual reports, rendered earlier in the year, of the American Society of Civil Engineers, the American Concrete Institute, the American Railway Engineering Association and the American Water Works Association recorded marked improvement in reduction of delinquent dues. Two weeks ago the Society for the Promotion of Engineering Education held the largest convention in its 42 years of existence. And last week the American Society for Testing Materials at its annual meeting presented "a much more encouraging picture than prevailed a year ago." This latter organization, always virile because of the necessitous nature of its services, nevertheless had to trim sail during 1931 and 1932, as a result of a falling off in industrial cooperation and reduced membership. Now, it is reported that the net

loss in membership for the past year was only 164 compared with 430 for the previous year, that 254 new members were added as against 170, and that income for 1934 will be adequate for an enlarged field of operation. These signs of the times are encouraging. They denote a measure of economic improvement, but most important of all they signify a faith in engineering organizations whose continued functioning is imperative if technological and industrial advance is not to falter.

Earthquake-Conscious?

EARTHQUAKE SHOCKS in southern California early last year, though causing loss of life and property, did much potential good. They did what engineers have tried to accomplish but without success for many years—arouse the public to the point where the advantages of making structural design reasonably earthquake-resistant are seen and accepted. California laws now recognizes the fact that proper designs can lessen seismic risks. Such laws place squarely upon public officials responsibility for seeing that buildings, particularly schools, are reasonably safe. In other words the collapse of a building due to earthquake shock is removed from the act-of-God class. An earthquake may be severe enough to cause the collapse of a well-designed building, but now it is recognized that considerable resistance against seismic risks can be provided at a low cost. Henceforth someone will have to answer when buildings collapse during moderate earthquakes simply because they lack such resistance.

Large office buildings recently built in California have included provision for a 10 per cent seismic factor with only about 5 per cent increase in the total cost of the building—and a 10 per cent seismic factor means a highly resistant structure, five times more than the 2 per cent now required by state law. This latter low factor of 2 per cent was thought advisable in a statute that would be applied on a statewide scale. On the other hand, it is left for communities in areas known to involve special seismic risks to put on higher restrictions. In coastal cities, cities near known earthquake faults, and in other locations where there is reason to make special provisions it is apparent that these higher restrictions should be applied. Judging from the new ordinances in Los Angeles and elsewhere, there is a trend toward adding them in regions where they are required.

In the past, some building ordinances did make provision against seismic risks by an increase in the wind load, but this was undesirable as the wind load could be reduced subsequently without full recognition of the result; also it did not adequately meet the real need. Therefore, writing seismic risks as such into laws is a great stride forward and probably is an important factor in making the new provisions permanent.

It is notable that of the various departments of the California state government, only that one having to do with schools thus far is charged with special instructions on seismic risks. This is a logical start, of course, because parents are compelled by law to send children to school; and if school buildings are negligently constructed someone should have to take responsibility. Ultimately it is probable that other state departments will recognize seismic risks, as it is not to be expected that bridges, dams and other structures will be immune from shocks. That this is soon to be realized is shown by the fact that the seismic factor was considered in the design of the San Francisco-Oakland Bay Bridge and in certain important dams recently constructed.

The statewide movement toward designing against seismic risk described elsewhere in this issue is unlike anything that has occurred heretofore. It is an extremely healthy and commendable trend. Previously private owners have seen the advantage of designing against a reasonable amount of lateral force. Now all building in California cities must take this factor into account, and special stress is placed on schools with attendant responsibility on public officials. Apparently, an "earthquake-conscious" viewpoint has come to stay. Are the developments of the past year in California the forerunner of a similar point of view throughout those regions of the United States where earthquakes are known to have occurred?

Transport Development

THE GRANDIOSE PLAN of Germany, outlined in this issue, to develop highway transport and coordinate it with railway service is part of a movement that in different ways is in progress throughout the transportation world. Germany's plan to build express highways in wholesale mileages is not likely to find imitation outside of continental Europe, but all countries are faced with the same problem of giving highway transport a fair chance to expand while keeping it within bounds of control in relation to other agencies of land transport. In all countries likewise the trend is toward centralized governmental regulatory authority. This is indicated by the Road and Rail Traffic Act of Great Britain, which has been substantially followed in general principles in the Transport Regulation Act of Victoria and similar regulatory legislation of the other British colonies of New Zealand and South Africa.

On this side of the Atlantic, Canada and the United States have not proceeded so definitely toward centralized road and rail traffic control. It is somewhat purposefully indicated, however, in our Emergency Railroad Transportation Act, which, among other duties, imposes upon the federal coordinator of transportation the task of planning further legislation to improve transport conditions generally. In Canada, which last year turned its hand positively to legislation to prevent unrestrained competition of its railways, indications are clear that road transport is destined soon for similar governmental dictation. In all, the trend everywhere is to regard rail and road transport as joint agencies for goods and passenger movement by land that must be regulated to serve the public cooperatively and not competitively.

The action of Germany in building national toll roads and rescinding imposts on motor vehicles is merely a drastic manifestation of a general movement toward coordination of transportation. Present conditions of strife between railways and roads for land haulage and between land and water transport do not subscribe in the least to the principles of public convenience and necessity on which the privilege of serving as common carriers is granted. Legislative regulation executed by central conciliatory authority is the certain result and is rapidly coming into existence. Its wise development calls for sound and unbiased thinking by railway and public roads officials.

CURRENT NEWS

PWA Releases Flood of 1,004 Non-Federal Project Allotments

WITH unprecedented speed, the PWA has taken advantage of the public works fund just voted by Congress and has already allocated more than $116,000,000 to 1,004 non-federal projects whose applications have been on file awaiting these additional PWA funds. These allotments were announced through four releases from PWA headquarters.

The first allotment list included 228 non-federal projects totalling $33,313,000 of PWA financing. The projects were distributed through 28 states and included 150 loans-and-grants and 78 grants. The second, released the following day, provided allotments for 255 more non-federal projects aggregating $33,006,883 of financing including 174 loans-and-grants and 81 grants. These projects were located in 30 states.

The following day a third announcement provided allotments for 238 more non-federal projects aggregating $25,165,788 for 162 loans-and-grants and 76 grants distributed through 28 states. Again, on the following day, Administrator Ickes released another series of 283 allotments aggregating $24,800,000 of PWA financing for non-federal projects including 210 loans-and-grants and 73 grants.

Small projects favored

Carrying out the announced program of Administrator Ickes to distribute this new PWA money widely in the form of small non-federal projects, the average financing for the present allotments averages about $115,000 of financing per project. However, there were 15 projects out of the 1,004 which received financing exceeding $1,000,000, as follows:

Woodville, Pa.	hospital	$2,100,000
Joliet, Ill.	waterworks	1,790,000
Clarksburg, W. Va.	sewers	1,400,000
New York City	pier shed	2,020,000
Jefferson City, Mo.	buildings	3,778,000
Fort Smith, Ark.	waterworks	1,650,000
Greenwood County, S. C.	power plant	2,767,000
Columbus, Ohio	sewers	1,618,000
Evansville, Ind.	sewers	1,172,000
St. Louis County, Minn.	roads	2,750,000
East St. Louis, Ill.	waterworks	2,360,000
Nashville, Tenn.	schools	2,000,000
St. Louis, Mo.	schools	2,000,000
Maverick County, Texas	power	2,422,000
St. Cloud, Minn.	power	1,229,000

A complete list of the projects financed by the new allotments, indicating the type of project, location and amount of financing will appear in a subsequent issue.

New York to Spend $2,000,000 On Farm-to-Market Roads

Governor Lehman of New York on July 2 directed the superintendent of public works and the state commissioner of highways to allocate $2,000,000 from the state's $11,000,000 of Federal aid highway funds to the construction of farm-to-market roads.

Twin Cities Consulting Board Reduced to Three Members

As a result of a conference between Harold L. Ickes, Administrator of the Public Works Administration, H. M. Waite, deputy administrator, and the trustees of the Minneapolis-St. Paul Sanitary District on June 29 the membership of the consulting board named recently by the PWA (*ENR*, June 14, p. 786) has been reduced from five to three and the fee to be paid reduced from $100 per day to $50 per day. Wm. N. Carey, State PWA Engineer, was made an ex-officio member of the board to serve without additional pay. It was decided at the conference that at times experts of various kinds might be employed.

The active members of the board to be retained are Chas. W. Kutz, and Frederick Bass of the University of Minnesota. Fred G. Cunningham and Darwin Townsend being taken off the board. Mr. Cunningham had recently been added to the board to succeed the late George W. Fuller.

Consulting Board Named to Study San Gabriel Dam No. 2

The Los Angeles County Board of Supervisors has named three engineers, recommended by the American Society of Civil Engineers, to investigate the stability of San Gabriel Dam No. 2, recently completed at a cost of about $3,000,000. The board is composed of Ralph J. Reed, consulting engineer, Los Angeles; I. C. Steele, chief of the civil engineering division, Pacific Gas and Electric Co., San Francisco, and Le Roy F. Harza, consulting engineer, Chicago. Action of the board of supervisors was taken on the request of citizens and property owners in the San Gabriel Valley below the dam who have expressed alarm at reports that the dam, a rock fill structure, has settled. Supervisor Roger W. Jessup opposed the employment of the consultants. He declared the county could gain nothing more from the inquiry than is now known through the state engineer, the present consulting board and staff.

Construction Appeals Board Announces Rules for Hearing Complaints

THE Construction Appeals Board, provided for by the construction code, has released information covering the hearing of appeals made by any interested party against a decision or ruling of a divisional code authority (referred to as an "appeal"); and, also, for determining which provisions shall govern in the event of conflict between the provisions of the various chapters of the code (referred to as a "complaint of interference"). In the rules and regulations, approved by the administrator, for the establishment of the board, it was given the authority to establish rules of practice and procedure, and to impose certain filing fees and to assess costs.

As adopted by the board at its meeting held June 8, these rules include the following essential points:

1 Appeals or complaints shall be sent to the Construction Appeals Board at the offices of the Construction Code Authority, Washington, D. C.

2 A fee of $25 is to be charged for filing any complaint or appeal, and is to be applied against the cost of any investigation or hearing.

3 The board may impose such additional charges as are reasonable in view of the nature of the controversy and the amount involved therein as a prerequisite for making an investigation or conducting a hearing. This additional charge will likewise be applied on account of reasonable expense of any investigation or hearing.

4 Reasonable expenses or a portion thereof may be assessed against one or all parties to the complaint or appeal in the discretion of the board.

5 Appeals or complaints are to be filed in writing, in 5 copies, one of which is immediately to be served upon the respondent or defendant who is given fifteen days to file his answer. A copy of the answer is similarly served upon the appellant or complainant.

6 At the hearing, interested parties may appear personally or by bona fide representatives or attorneys. Hearings will be held in Washington, or, in the discretion of the board, outside of Washington, and the parties will be notified not less than fifteen days in advance of the date set.

7 In case of complaint of interference, the board may, in its discretion, upon submittal, confirm a joint determination by two or more divisional code authorities.

8 Under the provisions of the code, a decision made by the Construction Appeals Board may be appealed to the administrator.

Under the procedure adopted, the chairman of the board may divide the board into sections of one or more members which shall hear and make determination of any proceeding instituted before the board, and assigned to it by the chairman. Such sections shall make a report of any such determination, which shall be reviewed by the board and determination by the board shall constitute a final disposition of the proceeding.

Plastering Chapter Approved

On June 27, the President approved an additional chapter to the construction code for the Plastering and Lathing Contracting Division. It is known as Chapter XX, and becomes effective July 27. This chapter covers the proposals made separately by the Contracting Plasterers International Association and the National Metal Furring and Lathing Contractors Association, which are hereby brought together under one administration. This is the second chapter to be approved carrying the PWA rates as minimum for skilled labor.

Identical Cement Bids Received For Fort Peck Dam Project

Ten bids were received for furnishing bulk cement for the Fort Peck dam project by the War Department and all bidders quoted the same figure of $2.7054 per barrel f.o.b. Wiota, Montana, the terminus of the government branch railroad to the site. The specifications requested quotations at the mill, but stated that delivered prices might be given if the code requirement permitted only delivered prices to be quoted.

The closest cement plant to the project is located at Trident, Montana, and this plant posted a mill price of $1.85. All other bidders, using this price as a basis, quoted identical prices at the point of delivery. The mill prices for the other nine plants ranged down to a minimum of $1.15, according to the statement of the War Department

The purchasing of cement on this basis, according to statement released by Secretary Dern, "would obviously be without competition, and the Department is not satisfied that the price quoted by the mill most advantageously situated is a fair and reasonable one, inasmuch as it is 61 per cent higher than the lowest mill price."

Because of this situation resulting, from the uniform bids, the War Department decided to restrict the present purchase to 200,000 bbl. which will provide for this season's requirements. The order for this quantity of cement has been placed with a plant at Louisville, Nebr., at a mill price of about $1.19, which was the second lowest mill price bid. The plant quoting the lowest mill price had already received several large orders for cement, according to the War Department, for work being built by the Department, and the Louisville plant has not, up to this time, shared in this work. The difference between the high mill price of $1.85 and the mill price of $1.19 per barrel for the accepted figure is intended to provide increased revenue to the railroads and thereby benefit a larger number of workers.

The purchase of the remaining 400,000 barrels of cement has been indefinitely postponed, according to Secretary Dern, who stated that "I hope that a more satisfactory competitive situation may be evolved by the time it becomes necessary to place this order. I also hope that we may get away from this undesirable condition of receiving uniform bids which permits a government official to legally award the business on the basis of friendship or influence."

Dumping of Garbage at Sea Stopped by New York City

Dumping of garbage at sea, an operation that has been a source of controversy between New York City and the state of New Jersey for many years past, was stopped by the city on June 28 when the first of three large new incinerators was put into service. July 1 had been set by the U. S. Supreme Court as the date upon which dumping must cease or the city must pay New Jersey $5,000 a day during which the dumping was continued when the city applied for an extension of time in which to complete its incinerator program (*ENR*, Dec. 7, 1933, p. 696).

PWA Allots District of Columbia $8,000,000 For Sewage Disposal Plant on Potomac River

TO REDUCE pollution of the Potomac River, the PWA has allotted $8,000,000 as a loan and grant to the District of Columbia for the construction of a sewage disposal plant. The allotment is the first to be made under new Federal legislation permitting this type of financing by the district.

In announcing the allotment, Administrator Ickes called on Maryland and Virginia to do their part in the general program of sanitation for the Potomac River. He said, "PWA has approved a loan and grant of $8,000,000 to the District of Columbia Commissioners for the construction of a sewerage disposal plant along lines recommended by a special board of sanitary engineers set up last September under a PWA allotment of $40,000. This board made a study of the District's sewage problem.

"The District Commissioners have informed me they regard the sewage disposal plant as the most important on their list of proposed projects. I concur in this opinion and have asked the Commissioners to submit to the Public Works Administration at the earliest possible date, their detailed plans for the plant.

"This project will go a long way toward purifying the Potomac River, which is being ruined by pollution. Unsatisfactory conditions in the river and on Chesapeake Bay will not be rectified, however, until Maryland and Virginia take steps to meet the District half way. I sincerely hope the Washington Suburban Sanitary Commission and the City of Alexandria, Va., will interest themselves in this project."

The $8,000,000 sewage disposal plant, which will be built on land owned by the District at Blue Plains, is part of a general scheme for the purification of the Potomac River. PWA already has made an allotment of $2,500,000 to Arlington County for a county sewer system.

The plan of sewering Washington, as it exists today, consists of intercepting sewers flanking all the watercourses which divert the dry weather flow from all sewers, which formerly discharged directly into the river, to a common pumping station where the sewage is pumped to discharge into the Potomac River. Concentrated discharge of the District sewage through an outfall sewer was begun in 1907 and has resulted in considerable agitation which precipitated an investigation by the U. S. Public Health Service. The Public Health Service was most emphatic in stating in its report that "no place within the limits of the District could it be considered safe for bathing." Since 1925, there has been increasing agitation for the removal of sewage pollution from the Potomac River.

The allotment is a loan and grant, the loan to be repaid under the terms of the law recently enacted by Congress authorizing the Commissioners to borrow from PWA to the extent of $10,750,000. The grant will be 30 per cent of the cost of labor and material, which engineers have estimated at $7,200,000.

RAPID PROGRESS MADE ON MISSISSIPPI RIVER BRIDGE AT NEW ORLEANS

The progress made on the combined highway and railway bridge across the Mississippi River at New Orleans is shown in this recent airplane view taken from the east side of the river. In the foreground is the 2-mile railway approach viaduct, bright with its finish coat of aluminum paint, and nearer the river are the two highway approaches, carried on cantilever brackets on the viaduct towers. Erection of steel for the viaduct on the far shore was begun in March, as was erection of the main river spans. Six of the nine piers have been completed. Pier construction was described in *ENR*, May 10, 1934, p. 589.

The city of New Orleans lies in the extreme upper-left corner of the picture beyond the bend in the river. The bridge is being built jointly by the Louisiana state highway commission and the New Orleans Public Belt Railroad.

Budget Approved For Contractors' Code Authority

GENERAL JOHNSON has approved a $290,300 budget for the general contractors' division of the construction industry for one year and, also, a basis of contribution. The administrator's approval of the budget is conditioned upon submission by the code authority, within 30 days, of an itemized and notarized statement of the expenses of establishing the code; and upon submission, at the end of every 90 days, of an itemized and notarized statement of the authority's receipts and expenditures.

Further, the administrator reserves the right to require that the accounts of the authority be audited at the end of every such period, and to order a revision of the budget "whenever the facts developed indicate that justice may require such action."

The basis of contribution by members of the industry follows:

Amount of Construction Work or Services	Amount of Fee
$2,000- $10,000	$2
10,000- 20,000	3
20,000- 25,000	4
25,000- 30,000	5
30,000- 35,000	6
35,000- 40,000	7
40,000- 50,000	8
50,000- 60,000	10
60,000- 75,000	12
75,000- 100,000	15
100,000- 150,000	20
150,000- 200,000	30
200,000- 300,000	40
300,000- 400,000	60
400,000- 500,000	80
500,000- 750,000	100
750,000-1,000,000	125
1,000,000-2,000,000	200
2,000,000-3,000,000	400
3,000,000-4,000,000	600
4,000,000	800
Over $5,000,000	1,000

Procedure outlined

The Administrator's order of approval provides:

(1) "That the divisional code authority for the general contractors division of the construction code shall submit to the Administrator within 30 days after the date hereof an itemized and notarized statement of the expense of establishing the supplementary code of fair competition for the general contracting division of the construction industry.

(2) "That the divisional code authority of the general contracting division of the construction industry shall submit to the Administrator at the end of every 90-day period after the approval hereof and during the period of this budget, an itemized and notarized statement of its receipts and expenditures.

(3) "That the Administrator may require that the accounts of the code authority shall be audited at the end of any such period and the results of the audit submitted to him.

(4) "That the Administrator may order a revision of this budget whenever the facts developed indicate that justice may require such action by him.

(5) "That salaries of the personnel of trade practice complaints committee and of labor complaints committee be adjusted to establish a parity in their compensation for services."

Roosevelt Names Oil Executive To Head the New Housing Act

James A. Moffett, prominent oil executive and intimate friend of President Roosevelt has been named to administer the new Housing Act. Mr. Moffett is an officer in the Standard Oil Company of California and formerly was a vice president of the Standard Oil Company of New Jersey. It is the desire of the President that the $1,000,000,000 plan for home renovation and repair will be in full operation within 30 days.

Cost of Lumber is Reduced by Ten per cent as Building Aid

As a major contribution to the building program, launched by the enactment of the President's Housing Bill, the National Retail Lumber Dealers Association through its Code Authority has released orders effective immediately to its 20,000 membership which will result in the reduction of prices on lumber and building material approximately 10%. This announcement was made officially by Spencer D. Baldwin, president of the association.

Mr. Baldwin estimates that the reduction will mean a saving of at least $60,000,000 to home owners who repair, and build new homes, in the first year's activities under the Housing Act. Though lumber is the chief item to be affected by this announced reduction, the association will lower prices on other materials which go into home construction or repair.

Col. George M. Hoffman Retires From Active Work in the Army

Colonel George M. Hoffman, Corps of Engineers, U. S. Army, division engineer of the North Atlantic Division at New York, retired from active service on June 30, having reached the statutory retirement age (64 years). He was retired with the rank of brigadier-general in recognition of his service in the Canal Zone during the construction of the Panama Canal.

General Hoffman is a native of Wilkes-Barre, Pa., and a graduate of the U. S. Military Academy in the class of 1896. In the intervening 38 years he has served continuously in the Corps of Engineers, including service in Cuba during the Spanish-American War, in France during the World War, and a considerable amount of time on the Mississippi River and its tributaries. His service in France began with the command of the 11th Engineers on railroad construction behind the British front at Cambrai, and it was following the attack on Cambrai in the fall of 1917 that the American people received the first word of the employment of American engineers in that important engagement through the message from Field-Marshal Haig to General Pershing, thanking him for the aid given by "Colonel Hoffman and his gallant men."

On the Panama Canal work General Hoffman supervised the construction of Gatun Dam as assistant division engineer, Atlantic Division. He has been division engineer at New York since 1928.

Col. James A. Woodruff, formerly district engineer at Philadelphia, has succeeded General Hoffman as division engineer at New York.

Code Price Cutting on Government Work Now Permitted

CUTTING of prices below those established under NRA Codes is now permitted when bidding on government orders for materials and services under an executive order issued on June 29. As the order applies to "any agency or instrumentality of the United States or to any state, municipal or other public authority" a very wide range of materials and equipment is affected.

The order in full follows:

By virtue of and pursuant to the authority vested in me under Title I of the National Industrial Recovery Act of June 16, 1933 (ch. 90, 48 stat. 195) and in order to effectuate the purposes of said title, it is hereby ordered as follows:

1. Any person submitting a bid to any agency or instrumentality of the United States, or any state, municipal or other public authority, to furnish goods or services at prices which, in accordance with the requirements of one or more approved codes of fair competition, must have been filed, prior to their quotation, with the code authority, or other designated agency, shall be held to have complied adequately with the requirements of such code of fair competition: (a) if said bidder shall quote a price or prices not more than 15 per cent below his price or prices filed in accordance with the requirements of such code or codes; and (b) if, after the bids are opened, each bidder quoting a price or prices below his filed price or prices shall immediately file a copy of his bid with the code authority or other appropriate agency with which he is required to file prices.

2. If, upon complaint made to the Administrator for Industrial Recovery, he shall find, after due investigation, that the tolerance of 15 per cent provided in this order is resulting in destructive price cutting in a particular trade or industry, he is hereby authorized to issue an administrative order reducing said tolerance of 15 per cent for such trade or industry to the extent he shall find necessary to prevent such destructive price cutting, but in no event to a tolerance of less than 5 per cent.

3. The Administrator for Industrial Recovery is directed to cause a study to be made of the effects of this order upon the maintenance of standards of fair competition in sales to public and private customers and to report to the President thereon within six (6) months of the date of this order.

All prior executive orders, including executive order No. 6646 of March 14, 1934, are hereby modified in so far as, and to such extent, as they may be in conflict or inconsistent with this order.

FRANKLIN D. ROOSEVELT.

The White House,
June 29, 1934.

Open market price

Under this order the price bid, whether or not it brings the contract to the bidder, becomes his open market price to be filed with the code authority. The price bid on one contract may be further reduced on successive contracts but there is nothing to prevent any bidder from immediately following up with a notification of price increases under the procedure that the code by which he is governed may require.

Competitors who have reason to believe that the low price of any bidder is made possible only by unfair practice may complain to the NRA and if it finds that the tolerance of 15 per cent is resulting in destructive price cutting it may reduce the tolerance, but not to less than 5 per cent.

This order is believed to have been caused by the submission to the government of identical bids for cement and other materials.

Planning Institute Discusses Housing And State Planning

HOUSING problems and state planning progress were the principal topics discussed at the Chicago conference, June 15 and 16, of the American City Planning Institute. Alfred Stern and Coleman Woodbury, chairman and secretary respectively of the Illinois Housing Commission, outlined the difficulties encountered in getting housing under way. The chief difficulties, said Mr. Coleman, are shortage of personnel, lack of public education in the necessity and methods of procedure and failure to provide backgrounds from which logical location and type of housing may be chosen.

Housing has plenty of momentum in Europe but here we must start from scratch, he said. Demolition of unfit habitations should proceed in every city. In his opinion, city-plan research is essential. It should include a census estimate based on many factors often not considered, such as industrial and commercial employment possibilities, and the economic status of industry and business. A true use value of land should be arrived at which would eliminate expected increase by reason of gross "over zoning." High taxes which encourage "tax payer" structures were deplored and the suggestion was made that taxes should be low on unused land if the public were given the use of it for recreation purposes. Another suggestion was to reduce the time allowed for non-conforming uses and to force removals at the end of the period of obsolescence.

PWA frustrated

J. L. Crane, president of the Institute, in introducing the subject of state planning, indicated some of the reasons why PWA was frustrated in making appropriations available for local use, which led into the necessity for planning. First was the fiscal distress of local governmental agencies; their inability to offer satisfactory collateral. Second is the overlapping-jurisdiction nature of many projects. Third is the disfavor, politically and otherwise, in which some cities or officials of those cities find themselves.

With some 18 engineers interested in state planning present a whole session was devoted to a recital of their experiences. Essentially these related almost wholly to fact finding and research methods. Little or no evidence of any planning came to the surface.

Illinois is working on a plan to reduce the number of counties, information being obtained to indicate that if the 102 counties were reduced to 7 each could be served by a county seat within 2 hours of the farthest resident. Only 15 county seats are important trade centers. Mr. Crane was not of the opinion that study by regions was possible except for metropolitan areas.

Indiana is working on the factors leading to the self sufficiency of families, and analyzing gainful occupations, including farming, marketing, importing, manufacturing and mining. Connecticut has completed an aerial map, a composite map for leisurely tourists who want an educational trip together with a guide book of historical nature, a study of water resources and a survey of rural electricity use. Michigan has just obtained $10,000 for state planning. Utah has been planned since pioneer days but the recent droughts have given planning a new impetus, particularly as to water conservation. New Hampshire was one of the first states to initiate state planning; largely from recreation standpoint. Missouri, Kansas and Iowa have the problems of sub-marginal lands, expansion through irrigation and contraction through return of lands to public domain. Much fact finding is being done.

Contracts Awarded for Highways In Shenandoah National Park

Administrator Ickes has announced the award of two contracts for national park roadways in the Shenandoah National Park in Virginia. The first of these is for 10 miles of grading and surfacing to Sammors & Robertson, of Huntington, W. Va., on the Compton Gap-Hogback Mountain section and is for $363,893. The second was awarded to Waugh Brothers, Fayetteville, W. Va., for 10 miles of grading and surfacing from Front Royal to Compton Gap, the cost of which will be $427,175. Work on these two contracts has started.

Work has previously been started on the section of this scenic highway along the peak of the Blue Ridge between Swiftrun Gap and Thornton Gap, a distance of 33 miles, and has also been started for connection of the highway in the Shenandoah National Park and Great Smoky Mountains Parkway near the joint boundaries of Virginia, North Carolina and Tennessee. The present contracts, to be completed not later than July 1, 1935, will open one of the world's largest mountain parks to the motoring public.

PWA Allots $24,500,000 to the Allegheny County Authority

Administrator Ickes has announced a loan and grant of $24,500,000 to the Allegheny County (Pa.) Authority for construction of the Pittsburgh-Homestead high level bridge, the Highland Park bridge, the Fort Duquesne bridge and twin tunnels including the Pittsburgh approaches and development of the Allegheny and Monongahela waterfronts on the point of land formed by the confluence of the two streams, a toll plaza to relieve traffic congestion at the south end of the Liberty bridge and tunnels, the Glenwood bridge, the Jerome Street bridge to McKeesport and the North Park swimming pool.

The Allegheny County Authority is a public body of the State of Pennsylvania created by an act of the Legislature which became law on December 27th, 1933. The law authorizes it to build and operate these projects for public use and to borrow money to build them. The three members of the authority are Joseph C. Trees, William McK. Reed and Press C. Dowles. The bridges to be built were designed by George Richardson, and E. L. Schmidt, county planning engineer of Allegheny County, represented the authority in presenting the application to PWA. Pittsburgh and surrounding industrial areas comprise nearly all of Allegheny County.

The grant portion of the allotment is estimated to be approximately $6,000,000, or 30 per cent of the cost of labor and materials which are estimated to amount to $20,000,000. The balance of the allotment above the grant will be a loan at 4 per cent interest repayable over a period of 30 years. Revenue will be obtained from tolls.

Property Owners Isolated by Levee Work on Mississippi Sue for Damages

A GROUP of property owners on an isolated peninsula in the Mississippi River has gone into federal court again, in an effort to collect damages for property that was cut off and left unprotected and undesirable by the flood control program. Federal Judge John E. Martineau, United States District Court of Arkansas, has issued an order to show cause why a mandatory injunction should not be issued against the St. Francis Levee District for payment of $123,917.50 to T. J. Ramey and others. The hearing will be held July 26.

The land owners were intervenors in a suit filed two years ago by Russell E. Gardner, a bondholder, as the outgrowth of a complex and unusual situation. The original levee board had constructed a levee around the peninsula known as Pecan Point, in Mississippi County, Arkansas. The levee thus built was nine miles long. When the federal government took over the levee program under the flood control act of 1928, a new levee was built across the peninsula, two miles long. This work left the land owners of the peninsula without the protection of the new government-built levee.

Nobody was apparently liable for the damages. The levee board was not considered liable because the cut-off levee had been built by the government. Further, it had been held by the Arkansas Supreme Court that levee boards were not liable for such damage, and an act of the state legislature had provided the same thing.

Nevertheless, the levee board agreed to pay landowners for the damages done at the rate of $75 an acre, totalling $233,000, provided it was found they had the necessary authority. While the board was waiting to learn whether it had the required authority, they actually paid the land owners sums totaling $88,000. Then it was learned that the board had no such authority.

The land owners petitioned the legislature to pass an act permitting the levee board to pay such damages, but the legislature discarded the proposed measure and passed another providing that the levee board could pay such damages, but that the amount should be fixed under the condemnation act of 1905. The land owners have never submitted this question to a court and jury.

Meanwhile, the bondholder started suit to determine whether such claims against the levee board held priority over bonds of the district. The court has ruled that they do hold such priority. This suit is revived by the latest petition of the land owners as intervenors.

Washington Notes

By Paul Wooton
Washington Correspondent

Administrator Ickes has warned Mayor Edward J. Kelly of Chicago that there is danger of Chicago being refused its application for an allotment of $2,814,500 to improve the Calumet River. He said the city must meet certain conditions by July 30 if the project were to be advanced. These conditions include: (1) local interests furnish the government, free, all land necessary for the project, (2) the War Department should receive s tisfactory evidence that 20 movable bridges across the sanitary canal would be placed in operating condition,. (3) no dredging could be undertaken in Lake Calumet until local interests gave assurances they would construct and operate adequate terminal facilities on the lake.

Ickes also told the mayor that Chicago would be required to revise local ordinances to acquire land and release a contract with the Nickel Plate Railroad entered into in 1925.

If the RFC is able to sell on the market, the municipal bonds purchased from the PWA, the $250,000,000 revolving fund created by Congress in the deficiency appropriation act may serve to expand considerably the volume of public works construction.

The law specifies $250,000,000 which the RFC may have invested at any one time in securities originally purchased or to be purchased by PWA in financing non-federal projects. Jesse Jones, RFC chairman, has asked Administrator Ickes for a list of the bonds now in the PWA portfolio. The proceeds of any bonds taken off its hands may be used by PWA for allotment to additional projects, either as grants or loans or both.

A. A. Berle, city chamberlain of New York, is negotiating with the RFC to borrow $50,000,000 for various public works projects. Jesse Jones, chairman of the RFC, said Mr. Berle had informed him that this sum represents what is needed over and above what PWA is able to allot to the city. No decision has been reached but Mr. Jones explained that PWA could make the loan for approved projects and that RFC could take it over by purchasing from PWA the city's bonds, in accordance with the provision in the recent deficiency appropriation act with reference to financing non-federal projects.

Railroad Loans at 5 per cent

No railroad that has good security should have to pay more than 5 per cent for money. This is the explanation given by Jesse Jones for the offer made by the RFC to take $17,500,000 of Baltimore & Ohio 3-year notes at this figure after arrangements had been practically completed to float an issue of $25,000,000 in the open market at a gross cost to the road of 5½ per cent. The money is needed to meet maturities totaling $17,500,000 on Aug. 10.

Chairman Jones disclaims any design on the part of RFC to monopolize railroad financing. The banks, he says, are in a position to continue handling railroad requirements but any road that needs money can get it "here" for not over 5 per cent on good collateral. The RFC is willing to give the B & O a little more than the above figure if the road thinks it can use the money.

William H. Bassett Elected President of the A.S.T.M.

At its annual meeting in Atlantic City, on June 27, the American Society for Testing Materials elected William H. Bassett, metallurgical manager, American Brass Co., Waterbury, Conn., its president for the new year. H. S. Vassar, laboratory engineer, Public Service Electric & Gas Co., Irvington, N. J., was elected vice-president for a term of two years.

William H. Bassett

Mr. Bassett graduated from the Massachusetts Institute of Technology in 1891. Following work as chemist and superintendent of the Popes Island Manufacturing Co., New Bedford, and later as chief chemist, Newark works, New Jersey Zinc Co., Mr. Bassett became chief chemist and metallurgist of the American Brass Co., in 1903. He was made technical superintendent and metallurgist in 1912, and in 1930 was appointed to his present office. A member of the A.S.T.M. since 1913, he has been particularly active in the nonferrous field. He was a member of the executive committee, 1916-1918, and was vice-president from 1932-1934.

ENGINEERING NEWS-RECORD is a consolidation of Engineer News and Engineering Record, effected in 1917. The Contractor was consolidated with Engineering News-Record in 1918.

Engineering News was founded in 1874 by George H. Frost, as The Engineer and Surveyor, which title subsequently became The Engineer, Architect and Surveyor, then Engineering News and American Railway Journal and finally Engineering News, under the editorships of D. McN. Stauffer, A. M. Wellington and Charles Whiting Baker.

Engineering Record was established in 1877 by Henry C. Meyer as The Plumber and Sanitary Engineer. The name was subsequently changed to The Sanitary Engineer, Engineering and Building Record, and, finally, to Engineering Record. During his ownership of the paper Mr. Meyer was directly responsible for the editorial policy. John M. Goodell became editor of the paper in 1902 and was succeeded in 1913 by E. J. Mehren.

E. J. Mehren became editor of Engineering News-Record at the time of the consolidation in 1917, and was succeeded by Frank C. Wight in 1924. In July, 1928, F. E. Schmitt was appointed editor.

The editorial staff comprises: *New York:* F. E. Schmitt, editor; V. T. Boughton, managing editor; C. S. Hill, W. G. Bowman, H. W. Richardson, F. W. Herring and J. I. Ballard. *Chicago:* W. W. DeBerard. *Southeast:* S. T. Henry. *San Francisco:* N. A. Bowers.

Engineering Council to Meet In Washington During January

Dates for the annual meeting of the assembly of American Engineering Council were fixed as Jan. 10-12, 1935, at the regular meeting of the executive committee held on June 22. The meeting will be in Washington. Jan. 10 will be devoted to committee meetings and Jan. 11-12 to meetings of assembly.

The executive committee authorized the secretary, Fred Feiker, to prepare a booklet outlining the function of Council in Washington and its relations to the many agencies there.

An application for membership from the Association of Consulting Management Engineers, Inc., was approved by the executive committee.

Progress reports were presented relating to the work of the committees on aeronautics, administration of public works, communications, flood control, telephone directory classification of engineers, and water resources.

Philadelphia Council Provides for Lease of Subway System

A four year lease of the Philadelphia subway system in Broad Street to the Philadelphia Rapid Transit Co. is provided for in an ordinance passed by the Philadelphia City Council on June 21. The lease is at a basic annual rental of $900,000. The subway is valued by the city at $130,000,000. The city's carrying charges on the subway bonds aggregate about $7,000,000 per year.

The lease was opposed by S. Davis Wilson, city comptroller, but the ordinance was passed unanimously. Comptroller Wilson urged delay until the United States district court had had a chance to act on the petition filed for the appointment of trustees to reorganize the transit system.

Obituary

FRANK LESKAR, a maintenance superintendent for the Illinois highway department, died June 25 at the age of 46.

ALBERT O. SMITH, who had served Suffolk county, N. Y., as superintendent of highways for 20 years, died suddenly July 1 at the age of 57.

GEORGE ALFRED DAMON, city planner, electrical engineer and civic leader in Pasadena, Calif., died suddenly June 23 at his home. He was 63 years of age.

CHARLES GUENTHER, for the last 16 years building inspector of East St. Louis, Ill., died in that city June 24 at the age of 80. He was one of the founders of the local Builders Exchange.

H. GREEN GARRETT, chairman of the Kentucky state railroad commission for eight years and chairman of the state highway commission for four years, died June 19 at Lexington, Ky., at the age of 70.

RUSSELL E. LAWRENCE, founder of the Lawrence Institute of Technology, Detroit, died June 25. Following his graduation from Rose Polytechnic Institute in 1913, he spent two years in the research department of the General Electric Co. and then returned to the Institute for graduate work in electrical engineering. He became professor of mechanical engineering at the

University of Detroit in 1919, and in 1921 was promoted to dean in the engineering college. For the last few years he has directed the work of the Lawrence Institute of Technology which he founded.

H. J. HAWKSHAW, for 32 years superintendent of construction for G. M. Gest, New York City, died June 14. He supervised the installing of a large number of underground conduit systems in many cities. For the last five years he was located in Cincinnati.

BENJAMIN FRANKLIN NELCH, member of the code committee of the National Contractors Association, died at Springfield, Ill., June 24, age 57 years. Mr. Nelch was a partner in the Henry Nelch & Son Co. and B. F. Nelch & Son Paving Contractors, and was president of the Asphalt Sales and Contracting Co. He entered the contracting business with his father, Henry Nelch, many years ago.

OLIVER I. STEIGERWALT, engineer and superintendent of construction for the Read-Coddington Engineering Co., during the building of the Niagara Falls Power Co.'s auxiliary power tunnel, the largest project of its kind attempted up to 1921, died June 24, at his home in Niagara Falls. After serving with the Read-Coddington company for a number of years, Mr. Steigerwalt went to the Abitibi project in Quebec where he served as consulting engineer in the construction of a large power development tunnel.

HERBERT A. BARRE, chief engineer of the Southern California Edison Company, Ltd., and for many years an outstanding figure in the construction and operation of Southern California electrical power supply, died suddenly June 28 at his home in Los Angeles, Calif. He was 59 years of age. His death was caused by cerebral hemorrhage.

Mr. Barre was largely responsible for the successful construction and operation of the first 150,000 volt long distance transmission line in the world, between the hydro-electric plants of the Edison Company's Big Creek-San Joaquin River development and Los Angeles. Later, and again under Mr. Barre's supervision, the conversion of these lines was effected for operation at 220,000 volts. This was in 1923.

In 1911, at the beginning of work on the Big Creek hydro-electric project in the Sierra Nevada mountains of Central California, Mr. Barre became connected with the Pacific Light and Power Corporation as electrical-mechanical engineer and continued in that capacity until that company was acquired by the Southern California Edison Company in 1917. Mr. Barre was made executive engineer of the company at that time, and in 1929 was appointed chief engineer.

CONSTRUCTION STATISTICS OF THE WEEK

NEW capital for engineering construction holds the spotlight this week due both to heavy federal allotments and the second highest week of the year in state and municipal bond sales. The new capital curve jumps from the previous cumulative total of $360,386,000 to $758,936,000. This is one month ahead of a similar jump last year when federal funds were poured into the market. This week's total includes $200,000,000 to the states for road work as provided by the Hayden-Cartwright Bill, $140,789,000 in non-federal PWA allotments from the $500,000,000 fund provided in the Deficiency Appropriations Bill, and a loan of $4,500,000 to a private corporation in Texas for preliminary hydro-electric development on the Colorado River. State and municipal bonds enjoyed their second highest sales this year, a total of $14,924,000.

Contract awards for the week represent only a 4-day week on account of the July 4 holiday and are the lowest of any week this year, $13,536,000. Of this total, $1,972,000 is for federal work, $9,552,000 for state and municipal and $2,014,000 for private contracts. All classes are low.

Highway awards dropped from $8,748,000 last week to $3,970,000 this week, commercial buildings from $5,348,000 to $884,000, and earthwork, irrigation and drainage from $5,942,000 to $1,514,000. The figures are not strictly comparable on account of the short week.

Large contracts for the week include highway awards by Georgia, $755,000 and by Kentucky $899,000; the Johns St. and Dayton Bluff tunnels for Minneapolis-St. Paul Sanitary Dist., $848,000; levee work in Missouri, Mississippi, Kentucky and Arkansas, $734,000 and the Newport Beach, Calif. harbor improvements, $558,000 by the U. S. Corps of Engineers.

CONTRACTS
(Thousands of Dollars)

	July 1933	Weekly Average Week Prev. 4 Weeks	July 5 1934
Federal Government	$632	$5,624	$1,972
State and municipal	5,704	17,343	9,550
Total public	$6,336	$22,967	$11,522
Total private	6,261	4,531	2,014
Week's total	$12,598	$27,498	$13,536
Cumulative to date:			
1933	$454,141	1934	$644,510

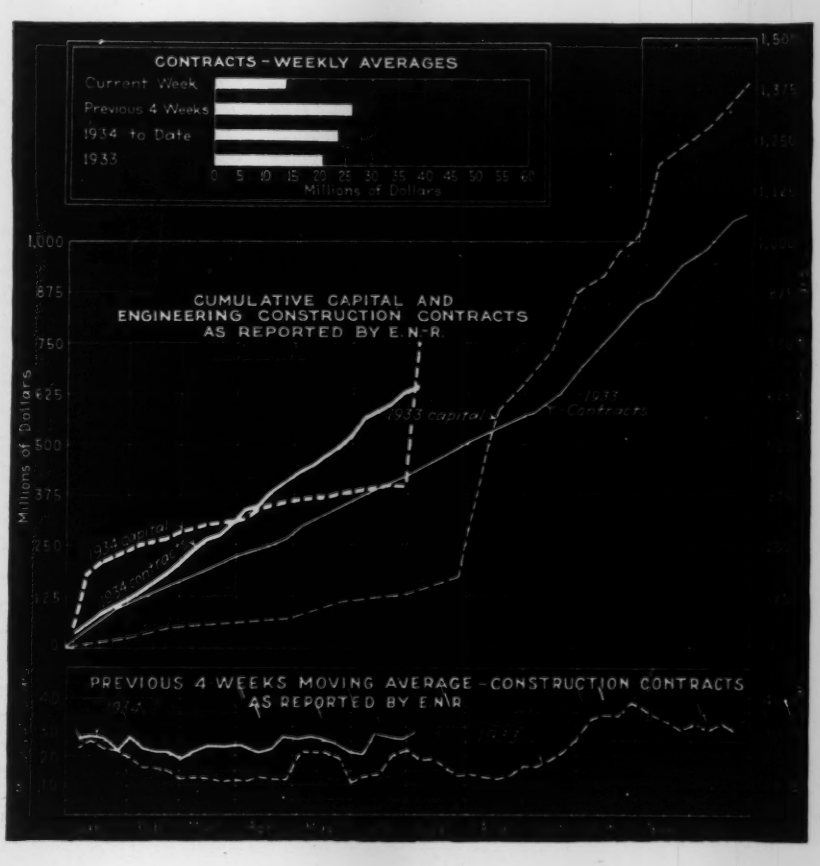
NEW PRODUCTIVE CAPITAL
(Thousands of Dollars)

1934	Week July 5	Cumulative
State and municipal	$14,924	$163,449
PWA allotments, S&M	340,787	514,450
RFC loans, S&M	.....	9,413
Corporate issues	175	16,686
PWA allotments, private	4,500	54,948
Total, Non Federal	$360,386	$758,936
PWA allotments Federal Constr.	32,000	81,568
Total new capital	$392,386	$840,504
Cumulative to date:		
1933	$169,756	1934 $758,936

NOTE: These figures include private bonds, and stocks sold for productive purposes; state and municipal bonds for construction; PWA loans and grants to states and municipalities, including the special highway funds; PWA private loans, and allotments for Federal construction.

INDEX NUMBER

E.N.-R.- Cost	1913 = 100	1926 = 100	E.N.-R.- Volume	1913 = 100	1926 = 100
July, 1934	199.65	95.97	June, 1934	119	50
June, 1934	199.61	95.95	May, 1934	101	44
July, 1933	165.50	79.56	June, 1933	109	48
1933 (Av.)	170.18	81.80	1933 (Av.)	102	45
1932 (Av.)	156.97	75.45	1932 (Av.)	127	56
1931 (Av.)	181.35	87.17	1931 (Av.)	220	96.5



BUSINESS SIDE OF CONSTRUCTION

June Contracts Gain 32 Per Cent; Six Months, 41.5 Per Cent Ahead

ENGINEERING construction closed the first half of 1934 with a 41.5 per cent gain over 1933 in dollar value of awards. The respective totals are $630,974,000 and $445,608,000.

June 1934 is 32 per cent ahead in dollar value of June 1933, and 9 per cent ahead on the volume index with adjustment made for the higher cost index.

Comparisons by weekly averages for June and for the first six months show that private work in June was 42 per cent below and for the average week to date, 10 per cent below the first six months last year. Public work is running well ahead as shown in detail by the accompanying table.

AVERAGE ENGINEERING CONSTRUCTION PER WEEK (IN THOUSANDS)

	June		First 6 Months	
	1933	1934	1933	1934
Federal	$ 562	$5,624	$2,116	$5,069
State & Municipal	9,402	17,343	8,973	14,282
Public	9,964	22,967	11,089	19,351
Private	10,872	4,531	6,049	4,918
Total	$20,836	$27,498	$17,138	$24,269

In June, street and road contracts held their $7,400,000 per week average for the third successive month, public buildings dropped back to an average of $3,021,000 and commercial buildings to a $2,000,000 average. Industrial buildings held at about $1,300,000.

Territorially, Far West, Middle West and New England show gains, while Middle Atlantic, West of Mississippi and South are slightly below last month. All territories show gains over last June except Middle Atlantic and West of Mississippi.

New Capital

PWA decks were cleared in June by rescinding many allotments which had not progressed to an active stage and revising other allotments with the net result that the full effect of private investment bond sales was not registered in the new capital curve. The municipal bond market continues strong with dropping interest rates and active competition for offerings. Refunding, funding, welfare, and relief financing is still taking much of this money but issues for new construction total $148,515,000 for the first half of 1934 compared with $94,158,000 in the same period of 1933. This represents a gain of 57½ per cent.

Material Notes

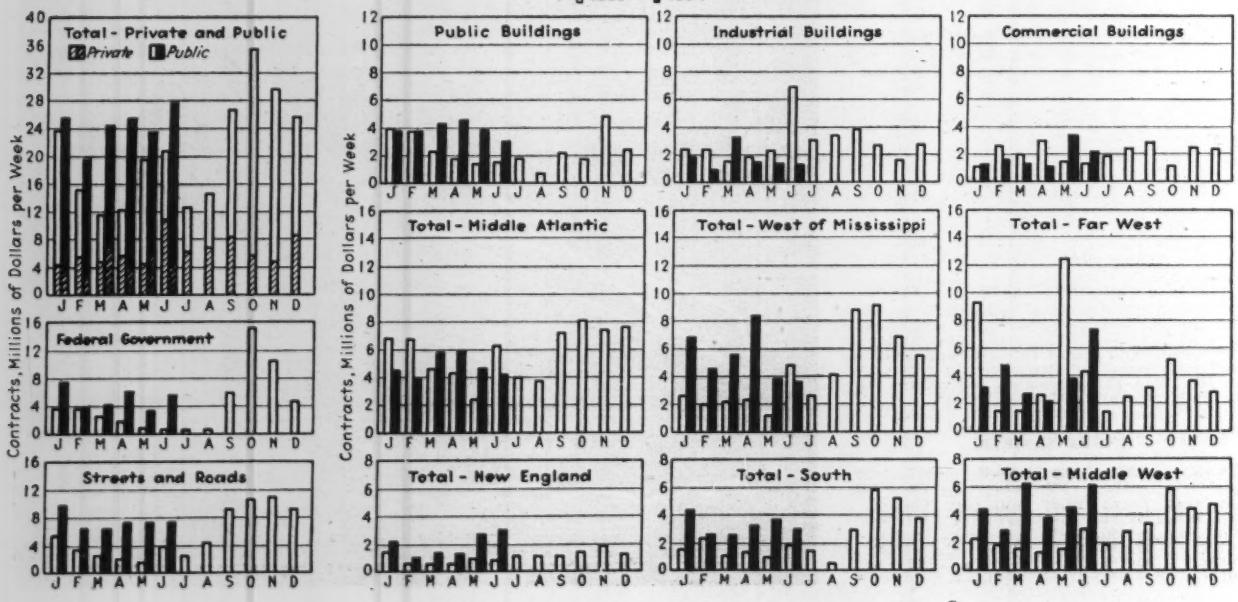
Cement—Portland cement production for May was 8,554,000 barrels and shipments from mills 8,731,000 barrels as reported by the Bureau of Mines. This is a gain in production of 36.6 per cent and of 30.1 per cent in shipments over May, 1933. The

ENGINEERING CONSTRUCTION CONTRACTS REPORTED IN JUNE, 1934

Four Weeks—Thousands of Dollars (000 omitted)

	New England	Middle Atlantic	South	Middle West	West of Mississippi	Far West	United States June 1934	United States Six Months 1934	United States Six Months 1933	Canada June 1934
Public Works										
Waterworks	645	2,264	563	5,516	722	2,705	12,415	32,143	52,249	78
Sewers	462	1,664	651	1,468	450	453	5,148	28,087	8,335	74
Bridges, public	35	294	126	1,748	2,368	2,342	6,913	49,535	51,075	.....
Earthwork and waterways	351	169	849	800	1,497	15,154	18,820	67,015	22,956	.....
Streets and roads	3,863	3,482	5,662	8,593	5,630	2,415	29,645	192,184	83,824	310
Buildings, public	2,912	4,160	1,780	893	1,588	751	12,084	99,185	62,319	290
Unclassified, public	30	1,143	130	798	62	4,681	6,844	34,967	6,874	51
Total public	8,298	13,176	9,761	19,816	12,317	28,501	91,869	503,116	287,632	803
Federal gov't. (included in other classifications)	510	722	2,380	846	1,904	16,134	22,496	128,468	54,941	.....
Private										
Bridges, private	.....	98	229	34	.....	.....	361	6,712	3,439	.....
Buildings, industrial	987	1,124	1,041	1,181	394	467	5,194	47,547	77,372	771
Buildings, commercial	1,905	2,679	418	2,370	824	400	8,596	48,554	48,619	775
Unclassified, private	868	102	750	1,191	877	185	3,973	25,045	28,568	50
Total private	3,760	4,003	2,438	4,776	2,095	1,052	18,124	127,858	157,998	1,596
June, 1934 (4 weeks)	**12,058**	**17,179**	**12,199**	**24,592**	**14,412**	**29,553**	**109,993**	.....	.....	**2,399**
May, 1934 (5 weeks)	13,923	23,276	18,548	22,555	19,407	19,034	116,743	.....	.....	10,492
June, 1933 (5 weeks)	4,496	31,512	7,830	14,894	24,003	21,465	104,200	.....	.....	1,755
Six months, 1934	51,950	127,473	84,289	123,636	140,301	103,325	.....	630,974	.....	22,157
Six months, 1933	22,083	134,985	39,219	50,854	67,368	131,121	.....	.....	445,630	3,349

CONTRACTS REPORTED—WEEKLY AVERAGES—1933-1934



ratio of production to capacity climbed to 37.5 in May compared with 27.4 a year ago and 29.6 in April.

Steel—The operating rate for steel companies, which averaged 47.35 per cent for the first five months and was 58.06 in May dropped back to 44.7 per cent for the week beginning June 25, as reported by the American Iron and Steel Institute.

Fabricated structural steel bookings, reported by the American Institute of Steel Construction, during May were lower than the average monthly bookings during the past seven months, but were 48 per cent larger than bookings the same month last year. May bookings were 35 per cent less than those of April (a record month this year), and 13 per cent less than the average monthly bookings during the first quarter of 1934.

Shipments during May were 24 per cent larger than the shipments during April, 82 per cent larger than the monthly average during the first quarter of 1934, 33 per cent larger than the monthly average during the last quarter of 1934, 33 per cent larger than the monthly average during the last quarter of 1933 and 29 per cent larger than during May last year. The tonnage ahead for fabrication is 42 per cent larger than at this time last year.

Lumber—The longshoremen's strike on the Pacific coast, combined with hand-to-mouth retail buying, has caused a drop in lumber shipments as reported by the National Lumber Manufacturers' Association to 144,130,000 feet during the week ending June 16. This preliminary figure compares with "revised" figures of 156,092,000 feet and 160,910,000 feet for the two previous weeks and will probably be subject to a slight revision upward on the next report. These totals are back to January levels.

To add to the effectiveness of the Housing Act, revision of the so-called model markup in the Retail Lumber Code has been ordered to make possible a reduction of from 4½ to 8½ per cent in the cost of lumber to the consumer. The National Retail Lumber Dealers' Association through its Code Authority has ordered the reduction of prices on lumber and building material approximating 10 per cent. This reduction in prices does not affect heavy construction timbers or wholesale prices.

Labor

Employment on public and private building construction projects not aided by PWA funds increased 16.5 per cent in May according to Bureau of Labor statistics. The increase in payrolls was 18.7 per cent and in man hours worked 19 per cent. Employment (number of wage earners) on projects financed by PWA funds increased 26 per cent in April over March with payrolls showing a 13 per cent increase and man-hours worked a 7 per cent increase.

Except for the tie-up in Washington the labor situation is clearing. The general strike on the three federal buildings in Washington was called off June 26. An injunction has been denied the operative plasterers against the bricklayers but the plasterers have accepted the decision granting the setting of acoustical stone in the Government Auditorium to the bricklayers' union. The cement finishers, members of the operative plasterers union, but not striking with the plasterers, are now refusing to lay tile floor because members of the bricklayers union are engaged in acoustical stone casting as well as setting. They claim this work should be done by plasterers. The plasterers strike which began on May 19 was still in force June 30. The union is demanding a 25-cent increase in the existing $1.50 hourly wage and a reduction in working day from 8 to 6 hours. The union carpenters' strike was settled at a wage of $1.25 per hour and a 40-hour week, but some contractors are offering only the PWA minimum skilled rate of $1.10. The matter was up for a hearing before the Board of Labor Review June 28. Reports on the 30th indicated that the $1.10 rate would probably be upheld by the board. This rate was set up by an agreement signed August 14, 1933 by the heads of five building trades unions and also adopted as the PWA minimum skilled rate. Another general strike threat was averted when non-union painters were replaced with union men.

The Fore River bridge strike ended on June 4 when representatives of workers and contractor signed an arbitration agreement with the Boston office of the New England Regional Labor Board. Details of agreement were not announced, but involved the degree of skill represented by pile drivers who asked an increase from 60c. to $1.00 an hour.

At Rochester the TERA strike ended on June 4, by a 4 to 1 vote to return to work.

In Maryland a wage rate of $1.10 an hour was unanimously agreed upon at meetings held by the Mason Contractors Association, Independent Bricklayers and Stonemasons Union and Bricklayers and Masons Local No. 1, of Maryland. Meetings were authorized by Frank Downing, of the Code Authority on brick and mason work in the State.

At Buffalo, N. Y., Regional Labor Board, after hearing lengthy arguments on both sides, has recommended that employees of the Contracting Plasterers Association of Buffalo accept the wage scale of $1.25 on a six-hour, six days-a-week basis offered by the association. The board further recommended that the new wage scale become effective Sept. 15, except where contracts with the association were consummated after the date of their decision. The strike at Buffalo has been in progress since June 1.

In Canada the wage schedule agreed upon by Builders Exchange and Trade Unions for 1934-1935 is: Bricklayers 70c., Carpenters 60c., Electricians 65c., Hod Carriers 40c., Hoisting Engineers 55c., Common Labor 35c., Metal Lathers 65c., Wood Lathers, 55c., Stone Masons, 70c., Painters 60c., Plasterers 67c., Plumbers 65c., Tile Setters 65c., Marble Setters 70c.

ENR Cost and Volume Index

The Engineering News-Record Construction Cost Index for July is 199.65, an increase of .04. The change is due to an increase in lumber and a slight decrease in labor. The Volume Index at 119 is an increase over May and over June, 1933.

INDEX NUMBER

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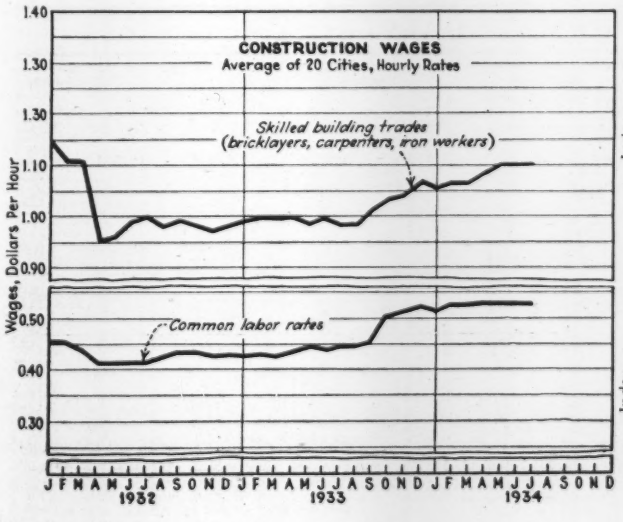
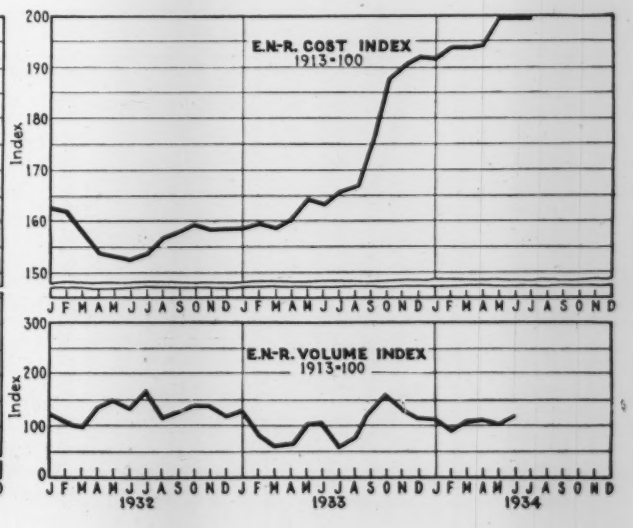
July, 1934	**199.65**	**95.97**	**June, 1934**	**119**	**50**
June, 1934	199.61	95.95	May, 1934	101	44
July, 1933	165.50	79.56	June, 1933	109	48
1933 (Av.)	170.18	81.80	1933 (Av.)	102	45
1932 (Av.)	156.97	75.45	1932 (Av.)	127	56
1931 (Av.)	181.35	87.17	1931 (Av.)	220	96.5





CURRENT PRICES OF CONSTRUCTION MATERIALS

CEMENT, AGGREGATES AND READY-MIXED CONCRETE

	PORTLAND CEMENT — Per bbl., carload lots, f.o.b. city, including cost of bags			SAND AND GRAVEL — Per ton, carload lots, f.o.b. city			CRUSHED STONE — Per ton, carload lots, f.o.b. city		CRUSHED SLAG CONCRETE — Per ton, carload lots, f.o.b. plant		Ready Mixed 1:2:4, 50c.y. or more, delivered
	Cloth Bags*	Paper Bags	Bulk	Gravel, 1½ in.	Gravel, ¾ in.	Sand	1½ in.	¾ in.	1½ in.	¾ in.	
Atlanta	$2.79	$2.54	$2.34	$2.31	$2.31	$1.64	$1.69	$1.92	$1.80	$1.80	$9.00
Baltimore	2.66	2.41	2.21	1.80‡	2.00‡	1.25‡	1.90‡	2.00‡	2.25	2.25	7.75
Birmingham	2.55	2.30	2.10	1.75	1.75	1.40	.85	.85	.90	1.15	5.20
Boston	2.72	2.47	2.27	1.50	1.50	1.10	1.50	1.50	.....	.....	6.50
Chicago	2.85‡	2.60‡	2.40	2.60‡	2.60‡	2.05‡	2.60‡	2.60‡	.....	.....	.....
Cincinnati	2.57	2.32	2.12	1.30	1.30	1.20	1.80	1.80	.....	.....	6.70
Cleveland	2.45	2.20	.....	1.55	1.55	1.45	1.60	1.60	1.75	1.75	8.85
Dallas	2.45	2.20	2.00	1.35	1.35	1.10	2.25	2.20	.....	.....	6.35
Denver	3.60‡	3.40‡	.....	1.85	.....	1.25	.....	.....	.....	.....	.....
Detroit	2.25	2.00	1.80	1.15	1.05	1.00	1.10	1.10	1.30‡	1.30‡	6.00
Kansas City	2.50	2.25	2.00	.75[p]	.75[p]	.65[p]	1.25[p]	1.30[p]	.....	.....	7.00
Los Angeles	2.90	2.62	.....	1.90	1.90	1.40	1.90	1.90	.....	.....	6.70
Minneapolis	2.85	.....	2.40	1.00[p]	1.00[p]	.25[p]	1.00	1.00	.....	.....	7.00
Montreal	.....	1.70	.....	.....	1.60	1.45	.....	1.25	.....	.....	.....
New Orleans	2.47	2.22	.....	1.70	1.70	1.40	.....	.....	.....	.....	7.75
New York	2.90‡	2.65‡	.....	1.50†[k]	1.50†[k]	1.00†[k]	1.75†[k]	1.85†[k]	.....	.....	8.00
Philadelphia	2.60	2.35	.....	2.00‡	2.25‡	1.80‡	1.75‡	2.00‡	1.75‡	1.75‡	8.25
Pittsburgh	2.45	2.20	1.60	1.50‡	1.50‡	1.70‡	2.25‡	2.25‡	1.25	1.25	7.00
St. Louis	2.42	2.17	.....	1.85‡	1.85‡	1.85‡	1.75‡	1.75‡	.75§	.75§	7.50
San Francisco	2.72	2.52	2.20	1.35	1.35	1.35	1.50	1.50	.....	.....	7.53
Seattle	2.95	2.70	.....	1.50†	1.50†	1.50†	.....	.....	.....	.....	5.75

*Includes 40c. per bbl. for bags, 10c. allowed for each returnable bag. †Per cu. yd. ‡Delivered. §F.o.b. Granite City, Ill. [k]Barge lots alongside dock. [p]f.o.b. plant.

CURRENT MILL PRICES CEMENT TO DEALERS, CARLOAD LOTS, F.O.B. MILL

Charge for bags not included. For cloth bags, add 40c. per bbl.; 10c. refund allowed for each returnable bag; for paper bags add 15c. per bbl., not refundable.

	Bagged	Bulk		Bagged	Bulk		Bagged	Bulk
Alpena, Mich	$1.65	$1.60	Ironton, Ohio	$1.60	$1.55	North Birmingham, Ala	$1.75	$1.70
Buffington, Ind	1.60	1.55	Iola, Kans	1.70	1.65	Richard City, Tenn	1.85	1.80
Crestmore, Calif	1.72	.....	La Salle, Ill	1.60	1.55	Saginaw, Mich	1.65	1.60
Dallas, Tex. (Inc. 5c. tax)	1.80	1.75	Limedale, Ind	1.60	1.55	Steelton, Minn	1.80	1.75
Hannibal, Mo	1.60	1.55	Mason City, Ia	1.70	1.65	Universal, Pa	1.65	1.60
Hudson, N. Y	1.75	1.70	Norfolk, Va	1.76	1.71	Waco, Tex. (Inc. 5c. Tax)	1.80	1.75
Independence, Kans	1.70	1.65	Northampton, Pa	1.65	1.60	Wyandotte, Mich	1.60	1.55

STRUCTURAL CLAY BUILDING TILE, BRICK AND LIME

	STRUCTURAL CLAY TILE — PARTITION — Per M, lots of 2,000 pieces or over, delivered			STRUCTURAL CLAY TILE — LOAD BEARING — Per M, lots of 2,000 pieces or over, delivered			BRICK — Per M, in quantity, delivered		LIME — Per ton, in paper, carload lots delivered		
	3x12x12 in.	4x12x12 in.	8x12x12 in.	8x12x12 in.	10x12x12 in.	12x12x12 in.	Common backing	Straight hard	Hydrated finishing	Common hydrated	Pulverized or lump
Atlanta	$84.27	$89.87	$168.40	$189.50	$243.20	$277.90	$13.22	$13.50	$17.50	$12.10	$12.10
Baltimore	75.00	80.00	150.00	170.00	210.00	250.00	14.00	17.00	16.00	14.00	18.00
Birmingham	84.25	90.00	156.00	180.00	215.00	242.00	15.00	22.50	3.00§	1.75§	2.25§[e]
Boston	85.30	91.15	171.00	193.50	239.60	273.40	14.50	17.00	21.20	15.46	3.62§[e]
Chicago	66.00	70.40	132.00	.....	.....	.....	10.20	11.20	18.00	13.40	14.00
Cincinnati	84.65	84.65	163.00	163.00	205.25	228.25	17.50	17.50	15.97	12.48	.....
Cleveland	62.50	66.50	124.50	149.50	188.00	214.75	17.50	17.50	17.20k	14.50k	2.35k§[e]
Dallas	74.75	80.00	156.50	156.50	199.75	228.00	13.50	28.00	15.50	14.50	.....
Denver	78.50	88.00	141.50	166.50	196.00	225.00	11.50–15.50	21.00–30.00	30.00	22.00	.....
Detroit	69.50	74.10	139.00	185.70	229.90	284.65	12.00	13.00	20.00	20.00	16.00
Kansas City	63.50	66.00	120.00	160.00	165.00	198.00	11.50	20.00[m]	.60‡[c]	.55†[c]	2.25§
Los Angeles	77.50	94.25	134.00*	188.00	232.50	311.50	11.50	14.00	18.70	.....	19.70
Minneapolis	78.25	84.00	143.00	165.00	173.00	240.00	13.10	21.00	25.50	21.00	21.00
Montreal	.....	110.00	.....	.....	260.00	.....	15.00	21.50	23.00	13.00	.....
New Orleans	58.40	62.30	116.90	159.20	194.60	.....	14.00	.....	16.60	12.95	.....
New York	84.00	90.00	135.00*	193.30†	238.80†	295.60†	14.00	.....	20.80	16.00	20.80
Philadelphia	85.90	89.30	167.40	200.80	243.20	301.10	15.00	18.00	16.35	11.25	10.75
Pittsburgh	72.65c	77.45c	145.20c	164.60c	180.50c	206.25c	17.50	22.00	16.69	14.10	16.66
St. Louis	62.00	65.00	120.00	165.00	187.00	214.00	15.00	18.00	.48‡	.38‡	2.10[p][e]
San Francisco	84.00	94.50	225.00	.....	.....	.....	15.00	18.00	22.50	21.50	2.05[p]
Seattle	84.00	95.00	180.00	.....	.....	.....	15.50[d]	15.50	30.00	25.00	3.00§[e]

*6x12x12 in. †F.o.b. Perth Amboy, N. J. ‡Per sack. §Per bbl. kLCL. [p]Per bbl. 180 lbs. cLess 5% cash 15 days. [d]less $1 cash 15 days. [e]lump. [m]minimum.

ROAD SURFACING MATERIALS

	PAVING BRICK AND BLOCKS			PAVING ASPHALT		ASPHALT BINDERS — FLUXES		CUTBACK ASPHALT		ROAD OILS	ASPHALT EMULSION	
	Granite per M, lots of 50,000, 4x4x8 in., f.o.b. city	Brick per M, 3x8½x4 in., carload lots f.o.b. city	Wood per sq.yd., 3½ in., 16-lb. treat. f.o.b. city	Per ton, less than 80 penetration, f.o.b. city Tank car	Drums	Per gal., 80-300 penetration, f.o.b. city Tank car	Drums	Per ton, f.o.b. city Tank car	Drums	Per gal., f.o.b. city Tank car	Per gal., f.o.b. city Tank car	Drum
Atlanta	$100.00	$35.00	$2.25	$18.20	$23.41	$0.0728	$0.0989	$20.45	$27.28	$0.0728	$0.105	$0.105
Baltimore	125.00	44.00	2.25	17.00	22.00	.07	.095	.08†	.115†	.....	.....	.....
Birmingham	125.00	24.00	.....	18.00	23.00	0.778	.1028	.082†	.112†	.....	.06	.....
Boston	100.00	34.00	2.40	16.00	21.00	.075	.10	.09†	.12†	.075	.09	.125
Chicago	138.00	42.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cincinnati	100.00	37.00	.....	18.00	22.00	.09	.....	18.50	.....	.07	.08	.....
Cleveland	100.00‡	37.50	2.77	18.50	22.70	.0725	.085	.075†	.0875†	.0475	.09	.1025
Dallas	.....	25.00	.....	13.88	20.30	.0575	.082	.....	.....	.055	.12	.16
Detroit	.....	35.50	.....	19.67[k]	24.87[k]	.....	.....	17.00	22.50	.....	.....	.....
Kansas City	.....	35.00	2.75	18.00	23.00	.065	.1005	.08†	.13†	.04	.05	.085
Los Angeles	.....	48.50	.....	12.00	16.00	12.00#	16.00#	14.00	.....	.042	.06	.12
Minneapolis	.....	.....	2.50	18.10	24.60	.098	.098	21.75	34.55	.048	.....	.....
Montreal	.....	110.00	.....	14.00	19.66	.07	.093	19.00	26.50	.07	.125	.155
New Orleans	100.00	35.00	.....	14.50	18.50	.065	.09	.07†	.10†	.....	.....	.....
New York	135.00§	50.00	2.64	17.00	22.00	.07	.095	.08†	.115†	.....	.085	.12
Philadelphia	115.00	45.00	2.25	15.00	20.00	.06	.....	.07†	.10†	.06	.....	.....
Pittsburgh	115.00	40.00	.....	19.00	24.00	.0775	.1125	.086†	.121†	.0675	.....	.....
St. Louis	105.00	35.00	2.00	19.50	24.50	.08	.105	.09†	.12†	.04	.09	.125
San Francisco	.....	50.00	.....	12.00	18.00	12.00#	18.00#	12.50#	23.00#	.04	.0575	.1175
Seattle	.....	47.50	.....	18.00	23.85	18.00#	23.10#	15.00	.....	.03	.1920#	34.20#

Note: Paving asphalt, tank car or boat, f.o.b. Maurer, N. J., per ton, Bermudez, $25.00; Trinidad, $21.00. *Per sq. yd. †Per gallon. ‡4½x6x5½ in. #Per ton §4x5x9-in. Av. [k]Mexican.

CURRENT PRICES OF CONSTRUCTION MATERIALS

IRON AND STEEL PRODUCTS—BASE MILL PRICES

	STRUCT. SHAPES-PLATE Per 100 lb., carload lots	REINF. BARS Per 100 lb., ½-in. billet, carload lots	RIVETS Per 100 lb., ½-in. structural carload lots	WIRE NAILS Per 100 lb., base, carload lots	SHEET PILING Per 100 lb. base, carload lots	STEEL RAILS Per Gross Ton			TRACK SUPPLIES Per 100 lb., carload lots			
						Standard	Light	Re-rolled	Angle bars	Std. spikes	Tie plates	Track bolts
Birmingham	$2.00	$2.00	$1.95	$2.60	....	$36.375	$35.00	....	$2.55	$2.40	$1.90	$3.55
Chicago	1.90	2.10	3.10	2.60	$2.25	36.375	35.00	$34.00	4.10	3.50	1.90	4.65
Pittsburgh	1.85	2.05	3.00	2.60	2.15	36.375	35.00	34.00	2.55	2.40	1.90	3.55

IRON AND STEEL PRODUCTS—LOCAL PRICES F.O.B. WAREHOUSE

	STRUCTURAL SHAPES Per 100 lb., base price	REINFORCING BARS Per 100 lb., ½ in., base price		EXPANDED METAL LATH —Per 100 sq.yd., carload lots—		WELDED FABRIC REINFORCING —Per 100 s.f., carload lots—		6x6 in., No. 6 & 6 wires Per sq.yd.	SHEET PILING Per 100 lb. base price
		New billet	Rail steel	Std. diamond mesh, 3.4 lb	Std. ribbed 3.4 lb.	4x16 in., No. 5 & 10 wires	4x12 in., No. 8 & 12 wires		
Atlanta	$3.52	$2.32	$2.15	$19.50	$22.50	$1.60	$1.21	$0.151	$2.45
Baltimore	2.95	2.70	2.50	18.50	24.00	1.46	1.12	.137	2.65
Boston	3.57	3.13	2.98	21.00	25.00	1.50	1.14	.142	2.50
Chicago	3.25	2.10	1.95	22.00	26.00	1.46	1.12	.137	2.25
Cincinnati	3.30	3.10	3.10	25.01	29.50	1.44	1.11	.135	....
Cleveland	3.06	3.10	2.37	20.00	22.00	1.44	1.11	.135	....
Dallas	4.00	3.13	2.98	24.50	26.50	1.70	1.27	.161	2.985
Denver	3.92	3.66	....	23.00	27.00	1.70	1.27	.161	....
Detroit	3.30	2.635	2.635	18.50	21.50	1.48	1.13	.139	2.165
Kansas City	3.75	2.53	2.63	19.50	21.50	1.54	1.17	.145	2.65
Los Angeles	3.05	2.95	....	23.00	27.50	1.90	1.40	.18	2.50
Minneapolis	3.50	2.82	2.67	20.50	24.00	1.58	1.20	.149	2.55§
Montreal	3.50	3.00	2.80	....	....	....	....	....	3.30
New Orleans	....	....	....	19.50	23.00	1.58	1.20	.149	....
New York	3.42	2.67	2.52	20.50	24.00	1.48	1.13	.139	2.48
Philadelphia	2.055	2.34	2.19	20.00	23.50	1.44	1.11	.135	2.43
Pittsburgh	1.85‡	1.90‡	1.80‡	19.10‡	21.90‡	1.44	1.11	.135	2.15
St. Louis	3.49	2.45	2.29	20.50	24.00	1.46	1.12	.137	2.25
San Francisco	3.15	2.65	2.35	23.00	28.00	1.90	1.40	.18	2.45
Seattle	3.55	3.50	....	....	....	1.90	1.40	.18	....

‡Base Mill Price. Note: Shapes, bars and piling subject to quantity discounts. §Mill Price plus freight to Minneapolis.

PAINTS AND ROOFING SUPPLIES

	WHITE LEAD Per 100 lb. keg in oil, f.o.b.	READY-MIXED PAINT Per gal., drums, f.o.b.			ROOFING SUPPLIES Carload lots, f.o.b. factory				
		Graphite*	Aluminum†	Ferric Oxide‡	Rolls, slate surfaced, 85-90 lb., per sq.	Asphalt felt, per 100 lb.	Tar felt, per 100 lb.	Asphalt coating, per gal.	Tar pitch, 350-lb. bbl., per ton
Atlanta	$11.50	$1.60	$3.10	....	$1.74	$2.45	$2.70	$ .36	$23.40
Baltimore	11.00	1.40	2.25	$1.90	1.70	1.60	1.80	.28	24.00
Birmingham	11.50	2.35	2.35	1.85	2.25	2.10	....	.35	23.00
Boston	11.00	1.60	2.50	.04½x	2.15	3.30	3.30	.4266	20.00
Chicago	11.00	1.85	2.45	1.30	1.60	1.59x	1.59x	.24	20.00
Cincinnati	11.00	1.40	3.00	1.55	2.40	2.39x	2.39x	.36	21.00
Cleveland	11.00	1.65	2.35	....	1.43	50.00°	50.00°	.39	19.00
Dallas	12.00	1.80	2.41	....	3.15x	2.56	2.56	.36	36.00*
Denver	11.75	2.55	....	....	2.17	3.00	3.00	.50	30.00
Detroit	11.00	1.55	2.35	1.30	1.75	2.35	2.50	.37	27.00
Kansas City	11.12½	1.75	2.25	1.50	1.75	1.85	2.15	.33	26.75
Los Angeles	10.00	1.60	2.25	2.30	2.00	1.50	....	.45	....
Minneapolis	11.12½	....	....	....	1.60	1.59x	1.59x	.29	23.10
Montreal	9.40	1.70	3.45	1.65	2.00	2.62	2.02	1.40§	1.52§
New York	11.00	1.70	2.35	1.48	1.60	1.59x	1.59x	.232	20.00
Philadelphia	11.00	1.50	2.10	1.50	1.43	1.34x	1.34x	.29	20.00
Pittsburgh	11.00	1.05	1.95	.80	2.00	1.75x	1.75	.35	24.50
St. Louis	11.00	1.85	2.25	1.25	1.50x	2.33	2.33	.24	18.00
San Francisco	10.75	1.80	2.75	1.10–2.00	1.89	3.10	3.10	.38	26.00
Seattle	10.75	....	1.92	....	3.10	4.50	....	.50	27.60

*New Jersey State Hwy. Spec. 120M. †ASTM Spec. D266-31. ‡80% maximum ferric oxide. °Per ton. §Per 100 lb. xPer roll, 65 lb. xPer lb *500-lb. drums.
Note: Red lead dry, same as white lead in oil, red lead in oil 50c higher.

MISCELLANEOUS ITEMS

WINDOW GLASS

Discounts from latest jobbers list, Sept. 15, 1928

	Single or Double Thickness	
	A quality	B quality
Atlanta	85%	85%
Baltimore	88%	90%
Birmingham	88%	90%
Boston	88–10–5%	90–10–5%
Chicago	90%	92%
Cincinnati	87@10%	89@10%
Cleveland	85%	87%
Dallas	88%	90%
Denver	84@ 5%	86@ 5%
Detroit	87@10%	89@10%
Kansas City	89@10%	89@10%
Los Angeles	90%*	90@40%*
Minneapolis	87%	89%
Montreal	....	....
New Orleans	88%	90%
New York	89%	91%
Philadelphia	90%	92%
Pittsburgh	86%	88%
St. Louis	87%	89%
San Francisco	90%	90@30%
Seattle	90@10%	90@20%

*Disc. from list Aug. 1, 1929.

EXPLOSIVES

Per lb. dynamite delivered 50-lb. cases

	Gelatin 40%	Gelatin 60%
Atlanta	$0.215	$0.2375
Baltimore	.19	.21
Birmingham	.105	.120
Boston	.1625	.1775
Chicago	....	....
Cincinnati	.27	.29
Cleveland	.27	.29
Dallas	.155	.17
Denver	.1575	.1725
Detroit	.237	.255
Kansas City	.15	.20
Los Angeles	.1725†	.1925†
Minneapolis	.18	.19
Montreal	.1875	.2125
New Orleans	.19	.22
New York	.22	.235
Philadelphia	....	....
Pittsburgh	.105	.12
St. Louis	.13	.145
San Francisco	.1575	.1775
Seattle	.1525	.1675

†F.o.b. Arsenal.

CHEMICALS

Water, sewage treatment, road work, f.o.b., carlots, New York:	
Bleaching powder, in drums, f.o.b. works, per 100 lb.	$1.90
Calcium chloride, 77-80%, flaked, in 400-lb. drums or 100-lb. moisture proof bags, f.o.b. works, freight equalized with points of competition, per ton	19.50
Chlorine, cylinders, per lb. delivered	.05½
Silicate of soda, 60 deg., in drums, f.o.b. works, per 100 lb.	1.50
Soda ash, 58%, in bags, per 100 lb.	1.25
Sulphate of aluminum, in 100 lb. bags per ton	27.00
Sulphate of copper, in bbl., per 100 lb.	3.85

PILES

Prices, per linear foot, pine, with bark on f.o.b., New York; delivered from barge, 1½ to 2c. per ft. additional:

Dimensions	Points	Length	Short Leaf Barge	Short Leaf Rail	Long Leaf Barge	Long Leaf Rail
12 in. at butt	6 in.	30 to 50 ft.	$0.11	$0.155	$0.12	$0.15½
12 in.—2 ft. from butt	6 in.	50 to 59 ft.	.15	.20	.14	.19
12 in.—2 ft. from butt	6 in.	60 to 69 ft.	.16	.215	.15	.20½
14 in.—2 ft. from butt	6 in.	50 to 69 ft.	.185	.225	.19½	.23½
14 in.—2 ft. from butt	6 in.	70 to 79 ft.	.2025	.225	.23½	.29½
14 in.—2 ft. from butt	5 in.	80 to 85 ft.	.265	.375	....	....
14 in.—2 ft. from butt	5 in.	85 to 89 ft.	.305	.442	....	....

RAILWAY TIES

Prices f.o.b., per tie, for carload lots:		6 in. x 8 in. by 8 Ft	7 in. x 9 in. by 8½ Ft.
Boston	Oak, untreated	$1.00	$1.35
	Pine, untreated	1.00	1.35
	Pine, creosoted	1.45	2.00
New York	Long-leaf sap pine, untreated	.80	1.00
	Mixed oak, untreated	....	1.00
	White oak, untreated	.75	1.50
Birmingham	White oak, creosoted	1.40	1.45
	Southern pine, untreated *6x8x8'6"	1.00*	1.20
	Southern pine, creosoted	1.20*	1.40
Chicago	White oak, untreated	1.15	1.40
	Oak, empty cell, creosoted	1.50	1.88
	Oak, zinc treated	1.40	1.70
	Southern pine, creosoted	1.35	1.78
Los Angeles	Fir, untreated	.57	.80
	Fir, creosoted	1.75	2.50
Philadelphia	Red oak, untreated	1.00	1.50
	Red oak, creosoted	1.20	1.85
	White oak, untreated	.90	1.35
St. Louis	Red oak, untreated	.88	1.30
	Red oak, creosoted	1.25	1.85
San Francisco	Sap Pine or cypress, untreated	.75	1.30
	Douglas fir, green, untreated	.45	.63
	Douglas fir, empty cell, creosoted	1.14	1.56
Montreal	Birch or maple, untreated	1.00	1.00
	Birch or maple, creosoted	1.25	1.55

CURRENT PRICES OF CONSTRUCTION MATERIALS

WATER, SEWER AND DRAIN PIPE

	C. I. PIPE Per net ton, f.o.b. 6 in. and over b. & s. class B and heavier, C/L lots*	VITRIFIED SEWER PIPE — Per foot, delivered, standard 8 in., s.s.	12 in., s.s.	24 in., d.s.	36 in., d.s.	CLAY DRAIN TILE Per 1,000 ft., carload lots, f.o.b. 6 in.	8 in.	CONC. SEWER PIPE Per ft., delivered; ASTM Spec. C 14-24 12 in.	24 in.	WROUGHT STEEL PIPE — Full std. weight. Discounts from standard list or delivery from warehouse, except Pittsburgh prices are f.o.b. mill. Base price $200 per net ton. List prices per ft.: ¼ in., 9c.; ⅜ in., 12c.; 1 in., 17½c.; 2 in., 37½c.; 2½ in., 59c.; 3 in., 77c.; 4 in., $1.10; 6 in., $1.94. 1 to 3 in., Butt Weld Black	Galv.	2½ to 6 in., Lap Weld Black	Galv.
Atlanta	$42.00	$0.225	$0.405	$1.4625	$3.25	$80.00	$128.00	$0.55	$1.60	47%	40%	45%	37%
Baltimore	45.50	.33	.58	2.60	5.25	100.00	170.00	.75	2.00				
Birmingham	38.00	.25	.45	1.625	4.660	85.00	.....	.45	1.60	53.225%	42.205%	§54.45%	§43.429%
Boston	47.50	.231	.4455	2.025	5.945	60.10	101.00	.49	1.85	$7.62–34.29	$9.49–42.71	$47.51–83.69	$59.53–104.86
Chicago	46.50	.28	.54	1.98	5.60	85.00	120.00	.675	2.25	.....	.....	.....	.....
Cincinnati	45.00	.224	.432	1.89	5.74	64.29	.....	.40	1.40	57.33%	46.31%	58.55%	47.53%
Cleveland	46.50	.203	.3915	1.665	5.125	47.25	72.00	.536	2.102	58.4%	48.4%	60.6%	49.6%
Dallas	50.00	.27	.486	1.944	.....	160.00	229.00	.46	1.57	67.5%	58.5%	65%	57.5%
Denver	58.00	.23‡	.415‡	1.73‡	.....	.....	.....	.....	.....	56%	45%	43%	57%*
Detroit	46.50	.294	.567	2.25	5.125	100.00	150.00	.55	1.60	54%	42.3%	52.6%	41.8%
Kansas City	48.00	.38	.58	1.95	3.90	120.00	180.00	.....	.....	.....	.....	.....	.....
Los Angeles	46.50	.2825‡	.508‡	2.03‡	5.535‡	115.50	192.50	1.00	2.00	53.57%	43%	53%	42.51%
Minneapolis	48.50	.283	.51	2.04	5.13	65.00	120.00	.50	1.33	$7.80–35.12	$9.67–43.55	$32.08–74.98	$38.21–90.70
Montreal	.....	.....	1.02	3.64	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Orleans	44.00	.25	.45	1.62	.....	50.00	.....	.45	1.65	.....	.....	.....	.....
New York	45.00	.308	.594	2.64	7.38	.....	.....	.55	2.00	.....	.....	.....	.....
Philadelphia	43.50	.315	.6075	2.70	.....	150.00	230.00	.....	.....	52.37%	41.35%	53.39%	42.57%
Pittsburgh	48.00	.217‡	.418‡	1.80‡	5.43‡	46.00	82.00	.75	1.75	64%	55%	63%†	56%†
St. Louis	45.00	.27	.486	1.944	3.96	85.00	172.00	.80	2.28	55.796%	44.776%	57.021%	46.0%
San Francisco	46.00	.265	.477	1.908	5.22	105.00	175.00	.....	2.20	52.4%	63.4%	51.1%	64.6%
Seattle	47.50	.35	.63	2.52	.....	85.00	200.00	1.50	1.60	60.3%	51.3%	65.3%	52.3%
Burlington, N.J. (base)	42.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

*Gas pipe and class A, $3 per ton additional, 4-in., $3 per ton additional. †3½ to 6 in. ‡f.o.b. §3½ to 6 in. ¼2½–3 in.

LUMBER AND TIMBER

		SHORT LEAF YELLOW PINE AND DOUGLAS FIR — Per M ft. b.m., carload lots f.o.b. All Fir planks No. 2 common; Fir timber is No. 1 common. All S. L. Y. P. is No. 2 common or better and for No. 1 N. C. Box. Lengths up to 20 ft. 1x6, S4S	1x8, S4S	2x4, S4S	2x6, S4S	2x8, S4S	2x10 S4S	3x12 Rgh	6x12 Rgh.	12x12, Rgh.	LONG LEAF Y. P. Per M ft. b.m., C/L lots, f.o.b., merchantable grade up to 20 ft. 2x12 Rgh.	12x12, Rgh.
Atlanta	Southern Pine	$20.00	$21.00	$23.00	$19.50	$22.00	$23.00	$28.00	.....	.....	$38.50	$40.00
Baltimore	Southern Pine	27.00	28.00	32.00	31.00	31.00	34.00	41.00	.....	.....	57.00	60.00
	Douglas Fir	30.00	31.00	33.00	34.00	35.00	33.00	35.00	$32.00	$33.00		
Birmingham	Long Leaf	21.50	22.50	23.50	19.50	22.50	23.50	39.50	.....	.....	42.25	40.25
	Southern Pine	21.50	22.50	22.50	18.50	21.50	22.50	27.75	27.75	27.75	.....	.....
Boston	Southern Pine	33.50	35.25	39.00†	40.25†	58.00‡	63.00‡	76.00‡	.....	.....	76.00	76.00
	Douglas Fir	31.25	33.50	38.25	40.25	40.75	41.50	44.00	44.00	44.00		
Chicago	Southern Pine	29.00	30.00	35.00	31.00	32.50	34.50	45.00	.....	.....	54.00	58.00
	Douglas Fir	30.50	31.50	33.25	31.50	32.50	30.50	40.75	41.75	41.75	.....	.....
Cincinnati	Southern Pine	32.00	32.00	32.00	31.50	35.00	35.00	42.00	.....	.....	46.00	.....
	Douglas Fir	.....	.....	.....	.....	.....	.....	48.00	48.00	52.00	.....	.....
Cleveland	Southern Pine	28.50	29.50	31.50	28.00	30.50	31.50	45.00	42.00	.....	.....	60.00§
Dallas	Southern Pine	36.00	37.80	39.60	41.40	37.25	37.25	52.50	.....	.....	57.00	67.50
	Douglas Fir	37.00	37.00	39.00	39.00	39.50	41.30	56.25	66.15	61.65	.....	.....
Denver	Douglas Fir	.....	39.00*~	43.50*	43.00*	43.00*	45.00*	44.50~	40.00*	56.00	.....	.....
Detroit	Southern Pine	28.00	29.50	31.50	28.50	31.00	33.00	36.00	.....	.....	33.00	45.25
	Douglas Fir	.....	.....	.....	.....	.....	.....	42.25	45.25	45.25	.....	.....
Los Angeles	Douglas Fir	31.00	32.00	31.50	30.00	30.00	30.00	34.50	34.50	34.50	.....	.....
Minneapolis	Western Pine	49.50*	47.00*	43.50*	41.00*	41.00*	41.00*	53.25*¼	.....	.....	.....	.....
	Douglas Fir	46.50*	47.00*	42.75*	38.00*	38.00*	40.00*	49.75*	50.25*	53.25*	49.50*¼	.....
Montreal	Spruce	36.00	36.00	30.00	30.00	32.00	34.50	36.00	.....	.....	42.00†	.....
	Douglas Fir	47.50	47.50	42.75	51.25	51.25	57.75	.....	.....	.....	.....	.....
New Orleans	Southern Pine	26.45	27.70	32.70	27.45	30.45	31.70	43.70	.....	.....	45.20	52.45
	Douglas Fir	28.00	30.00	33.00	28.00	32.00	33.50	37.50	.....	.....	.....	.....
New York	Southern Pine	36.50*	37.75*	39.75*	35.25*	38.50*	39.75*	47.75	.....	.....	78.50*	77.25*
	Douglas Fir	.....	.....	44.73*	43.00*	43.50*	44.00*	40.00*	41.75*	41.75*	.....	.....
Philadelphia	Southern Pine	27.50	28.50	30.50	27.25	29.00	30.25	35.00	.....	.....	66.00	64.00
	Douglas Fir	.....	.....	35.50	35.50	35.00	35.00	35.00	35.00	35.00	.....	.....
Pittsburgh	Southern Pine	26.50	27.75	32.75	29.25	31.75	32.75	41.50	.....	.....	57.50	57.50
	Douglas Fir	33.50	34.50	34.50	33.50	34.00	34.25	46.25	46.25	46.25	.....	.....
St. Louis	Southern Pine	38.00*	39.00*	45.00*	37.50*	40.00*	40.50*	53.50*	.....	.....	62.00*	73.50*
	Douglas Fir	.....	.....	.....	.....	.....	.....	56.50*	57.00*	57.50*	.....	.....
San Francisco	Douglas Fir	18.00ℓ	19.00ℓ	18.00ℓ	17.00ℓ	17.00ℓ	17.50ℓ	21.00ℓ	11.00ℓ	21.00ℓ	.....	.....
Seattle	Douglas Fir	22.50	21.50	21.50	21.00	22.50	22.50	20.00	20.00	22.00	.....	.....

*Delivered. †Spruce. ‡Long-leafed Y. P. §Norway Pine. ¼Northern Pine. ℓDouglas fir. ~Native. ℓAt ship's tackle.

CURRENT BUILDING AND CONSTRUCTION WAGE RATES PER HOUR

	Bricklayers	Carpenters	Structural Iron Workers	Hoisting Engineers	Plasterers	Common Labor — Building	Heavy Const
Atlanta	$0.70/1.125	$0.40/.90	$0.60/1.25	$0.60/1.25	$0.50/.75	$0.30/.40	$0.30/.40
Baltimore	1.25	1.10	1.37½	1.25	1.25	.45	.45
Birmingham	1.00	1.00	1.00	1.00	1.00	.30	.30
Boston	.90/1.30	.70/1.17½	1.20	.90/1.17½	.90/1.62½	.40/.70	.40/.70
Cincinnati	1.27½	1.02½	1.20	1.07½	1.27½	.45	.40
Chicago	1.50	1.31¼	1.35	1.31¼	1.50	.82½	.82½
Cleveland	1.25	1.12½	1.25	1.12½	1.25	.72	.72
Dallas	1.10	1.00	1.12½	.75	1.25	.40	.40
Denver	.60/1.12½	.60/.87½	.60/.87½	.60/.87½	.....	.50	.50
Detroit	1.25	1.00	1.25	.75/.95	1.25	.50	.50
Kansas City	1.32½	1.12½	1.25	1.12½	1.12	.50/.60	.60/.75
Los Angeles	1.00	.90	1.20	.90	1.00	.50	.60
Minneapolis	.90/1.20	.75	.90	.75	.90	.40	.50
New Orleans	1.00	.75	1.00	1.00	1.25	30./.40	.30/.40
New York	1.50	1.40	1.65	1.50/1.56¼	1.50	.82½	.82½
Philadelphia	.75/1.20	.60/1.20	1.00/1.20	.75/1.20	.60/1.20	.30/50	.30/.50
Pittsburgh	.50/1.00	.50/1.00	.50/1.00	.50/1.00	.50/1.00	.35/.50	.35/.50
St. Louis	1.50	1.25	1.47	1.35/1.47	1.50	.78½	.35/.78½
San Francisco	1.50*	1.10	1.37½	1.12½	1.25*	.62½	.60
Seattle	1.20	.90	1.25	1.12½	1.20	.60	.60
Montreal	0.70	.60	.60	.55	.67	.35	.25

Skilled Ave: (Bricklayers, Carp., Ironworkers) $1.1041. Common Ave. $0.53 *6-hr. Day

CONSTRUCTION REPORTS

WATERWORKS

PROPOSED WORK

Idaho, Grace—City plans replacing present supply main with concrete pipe and developing spring supply. $200,000.

Ind., Michigan—City soon takes bids filtration plant. $60,000. P.W.A. project. Greeley & Hanson, 6 North Michigan Ave., Chicago, Ill., engrs.

Ia., Storm Lake—City Council plans extending water system. Council conferring with bond experts on proposal to issue bonds.

Kan., Hanover—City plans nearing completion waterworks improvements. $18,000. Wilson Eng. Co., Farmers Union Bldg., Salina, engrs. $18,000.

Ky., Warsaw—H. Drees, Mayor, and City Council at office City Clerk, rejected bids waterworks, incl. deep well and pump, steel tank of tower, distribution mains, hydrants, valves and boxes, etc. $30,000. C. N. Harrub Eng. Co., American Natl. Bank Bldg., Nashville, Tenn., engrs. Noted Mar. 22.

Mich., Michigan City—City making plans and takes bids about Aug. 1 water filtering plant incl. constructing basins and plant; filter piping and equipment; high and low lift pump, elevated steel tank, 100,000 gal. wash water tank; electrical equipment; extending mains; elevated steel tank, 500,000 gal. capacity for distribution. $300,000. P.W.A. project. Greeley & Hanson, 6 North Michigan Ave., engrs.

Mo., Bolivar—City plans waterworks, $90,000. P.W.A. loan and grant approved. E. T. Archer & Co., 608 New England Bldg., Kansas City, engrs.

Mo., Cameron—City preliminary surveys completed waterworks improvements. Black & Veatch, 700 Mutual Bldg., Kansas City, engrs.

Mo., Carthage — Election soon $100,000, water softening plant. Black & Veatch, 700 Mutual Bldg., Kansas City, engrs. Noted Feb. 15.

N. J., New Brunswick—East Brunswick Twp. Com., plans water system, mains, hydrants, valves, tower tank. $75,000. H. H. Selover, Milltown, engr.

N. Y., East Rochester—Village voted to establish inCependent water system with 500,000 gal. storage capacity. $100,000. P.W.A. allotted $80,000. Awaiting approval of P.W.A. on plans and specifications made by R. McDonald, village engr. Noted Apr. 12.

N. Y., South Jamaica — Jamaica Water Supply, 161-20 89th Ave., Jamaica, plans steel water tank at 107th Ave. and East 178th St. $15,000.

Okla., Blackwell—City voted $56,000 bonds, 31,700 ft. 12 in. c.i. flow line. C. C. Stoldt, Blackwell, engr. Noted July 13, 1933.

Okla., Freedom—Election July 3, $15,000, for elevated water tank. V. V. Long & Co., Colcord Bldg., Oklahoma City, engrs. Noted Oct. 16.

Okla., Guthrie—City voted $96,000, to construct watermains and plant improvements. W. Ritzhaupt, Guthrie, engr. Noted May 24.

Tex., New Braunfels—New Braunfels & Gulf Water Supply Corp., H. L. Atkinson, pres. bd., geological report filed with P.W.A. engineers, for building fresh water pipe line from fresh springs, here, to Corpus Christi, will furnish water to small towns enroute, probably use 18 in. steel pipe. $5,000,000. Noted May 10.

Utah, Elwood—City plans water system. $71,000. Applied for P.W.A. loan.

Utah, Orangeville — City plans constructing gravity water system. $20,000. P.W.A. loan applied for.

Wis., Madison — City, A. W. Barns, clk., plans 500,000 gal. rein.-con. reservoir, 2 motor driven centrifugal pumps, 2 air compressors, and connecting pipe line. $100,000. Engineer not appointed.

BIDS ASKED

N. J., Totowa—July 11, by C. N. Leathem, Jr., state archt., Capitol, Trenton, 50,000 gal. steel tank and tower, at North Jersey Training School for Dpt. Institutions and Agencies, Trenton. $12,000.

O., New Philadelphia — July 9, by City Council, 2 m.g.p.d. water softening plant, three 13x16x10 ft. filters, 100,000 gal. softwater storage. P.W.A. project. C. P. Hoover, 8 East Long St., Columbus, engr. Noted Jan. 18.

Okla., Ponca City—July 23, by City, 8 m.g. rapid sand filtration plant, 13,000 ft. 27 in. and 6,000 ft. 12 in. pipe line, 2 dams involving 500,000 cu.yd. earthwork and 40,000 cu. yd. rock excav. $560,000. W. R. Holway, 302 East 18th St., Tulsa, consult. engr. Noted Apr. 5.

Ont., Burlington—Water Com. bids about July 9, for intake pipe and force main, first units in connection with waterworks and purification plant, $150,000. G. H. Power & H. G. Acres & Co., Ferry St., Niagara Falls, consult. engrs. Noted May 3.

CONTRACTS AWARDED

†**Calif., Los Angeles**—Vet. Bu., Arlington Bldg., Wash., D. C., steel water tank, to Chicago Bridge & Iron Co., 1700 Walnut St., Phila., Pa., $10,420. Bids May 29. Noted May 3.

Ga., Rockmart—City, J. C. Meek, Mayor, waterworks system, to Lackawanna Constr. Co., Jacksonville, Fla., $8,518***sewerage system, to J. W. Cockran, Rockmart, $6,883*** swimming pool, to A. J. Collins, Atlanta, $6,930. Grand total $22,331. **P.W.A.** Bids Feb. 26. Noted Dec. 14.

Mass., Paxton—Town, Bd. Water Comrs., general contract water supply system, to R. Susi, 60 Olney St., Dorchester, $22,830. **P.W.A.** Noted Dec. 27.

Mass., Sharon—Water Dpt., Town Hall, laying 3,800 ft. 6 in. c.i. pipe, to A. C. Trojano, 102 Shaw St., Braintree; furnishing gate valves, to Ludlow Valve Mfg. Co., 73 Tremont St., Boston.

N. Y., Saranac Lake—Village, hydrants and valve boxes for waterworks, to G. B. Starks & Co., Inc., $494; pipe and fittings, to Central Fdry. Co., 420 Lexington Ave., New York, $7,088. Bids May 14. Noted May 10.

N. Y., Watervliet—City, valves for waterworks, to Ross Valve Co., Troy, $895***to Rennselaer Valve Co., Ontario St., Troy, $862***to Ludlow Valve Co., foot Adams St., Troy, $2,979***and to Eddy Valve Co., South Waterford St., Waterford, $654. Grand total $5,391. **P.W.A.** Noted June 7, under "Contracts Awarded."

S. C., Cameron—City, constructing distribution system, to Boyce & Co., Clearwater, Fla., $16,484***2 deep wells, valves, hydrants and meters, to Snyder Pump & Well Co., Richmond, Va., $5,502***75,000 gal. elevated storage tank and tower, to R. D. Cole Mfg. Co., 57 East Broad St., Newman, Ga., $5,385. Grand total $27,371. **P.W.A.** Bids June. 6.

S. C., Holly Hill—Town, constructing distributing system, to Boyce & Co., Clearwater, Fla., $17,718***deep wells, to Snyder Pump & Well Co., Richmond, Va., $5,532***tank and tower, to R. D. Cole Mfg. Co., Newman, Ga., $5,399. Grand total $28,649.

S. C., Summerton—Town, constructing distribution system, to J. B. McCrary Co., 22 Marietta St. Bldg., Atlanta, Ga., $24,771*** deep wells, to Virginia Mchy. & Wells Co., 1319 East Main St., Richmond, Va., $3,707***tank and tower, to Chicago Bridge & Iron Wks., 37 West Van Buren St., Chicago, Ill., $5,465. **Grand total $33,943. P.W.A.**

Tex., Midlothian—City, c/o E. C. Allman, mayor, water wells, to Layne-Texas Co., 2nd Natl. Bank Bldg., Houston, $16,015***60,000 gal. elevated steel tank on existing tower, to Chicago Bridge & Iron Co., Magnolia Bldg., Dallas, $3,545. **P.W.A.** Bids June 18. No bids received on 100,000 gal. concrete surface reservoir, no action taken on water meters. Noted Apr. 26.

Wash., Snohomish—City, 6,750 ft. 10 in. wood and 400 ft. c.i. pipe (main supply), to R. Mastro, 6325 Brackon Ave., $9,468*** 15 mi. 14- to 18-in. wood pipe from gravity line to Pilchuck Dam to reservoirs, to Federal Pipe & Tank Co., 522 24th St. N.W., Seattle, $93,644***laying above pipe, to Acme Constr. Co., Seattle, $48,741. Grand total $151,853. Bids June 22.

Wis., Footville—See "Sewerage and Waste Disposal."

Wis., Milwaukee—City, constructing underground water and sewer line for water purification plant, to General Contractors, Inc., 494 West 49th St., $25,064. **P.W.A.** Bids June 21, awarded June 23. Noted June 14.

Ont., Exeter—P. Coates, chn. P. Utilities Comn., test wells in connection with new $35,000 waterworks system, to William Hopper, Seaforth. Noted June 14.

SEWERAGE AND WASTE DISPOSAL

PROPOSED WORK

Colo., Colorado Springs—City Council, E. Mosley, mgr., reviving plans for sewage disposal plant as P.W.A. project. Matter to be presented to taxpayers at city election in spring of 1935. Est. $400,000.

Ind., Muncie—City made plans and takes bids this summer sewage disposal plant. G. Dale, mayor. P.W.A. grant and loan approved.

Section Index

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Earthwork, Irrigation, Drainage and Waterways 3
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Sewerage and Waste Disposal 1
Unclassified 4
Waterworks 1

Buildings:

Public 5
Commercial 6
Industrial 6

Federal Government projects are classified under heading denoting type of work and designated by symbol of †

◆

Ia., Sioux City—City plans repairing sewers, culverts, streets washed out by floods, $100,000 damage. Applied for P.W.A. loan.

Mo., Kirksville — City will not construct sewers. $215,000. Project abandoned. Black & Veatch, 700 Mutual Bldg., Kansas City, engrs. Noted Jan. 18.

N. Y., Freeport—Election about July 15, $106,800 bonds for extensions in treatment of sewage in the plant and constructing new 4,100 ft. c.i. force main.

Pa., Albion—P.W.A. withdrew allotment of $63,500 to boro for new sewers and disposal plant. Boro in quandary and will postpone further action on project until further notice. Noted Jan. 18.

Ont., Fort William—City plans sewers. $35,000. C. B. Symes, city engr.

BIDS ASKED

Ark., Hot Springs—City bids about Sept. 26, 2 sewage disposal plants to purify waters of Lakes Hamilton and Catherine, complete with auxiliary piping. $300,000 Black & Veatch, Mutual Bldg., Kansas City, Mo., consult. engrs. P.W.A. loan and grant of $218,000 allotted and other Federal funds available. Noted June 28.

Minn., Winona—July 19, by City, 10,200 ft. 18- to 42-in. intercepting sewers. Div. A, B and C.; sewage treatment plant, pumping station and equipment. Div. D, E and F; landscaping side of treatment plant, Div. G. E. E. Chadwick, city engr.

Mo., St. Louis—July 24, by Bd. P. Wks., City Hall, constructing, 2,700 ft. 36- to 48-in. brick masonry or concrete sewers in tunnel, incl. shafts, manholes, junctions, connections, laterals and appurtenances for Section C-2 Down Town Relief Sewer. $89,000. P.W.A. project. L. A. Pettus, city engr.

N. H., Keene—City taking bids disposal plant, intercepting sewer and pumping station. $175,000. P.W.A. project. Weston & Sampson, 14 Beacon St., Boston, Mass., engrs.

N. Y., Geneva — City bids about July 15, constructing sewage disposal plant 2, $27,500, and outfall sewer $29,000.

N. Y., New York—July 11, by J. J. Lyons, pres. Bronx Boro, Bronx County Bldg., 161st St. and Concourse, sewer in Leyden Pl., East 141st St., Palmer, Tillotson, Givan, Baychester, Allerton, Nickle, Irwin, Noble, and Hunts Point Aves.

CONTRACTS AWARDED

Calif., San Francisco—S. J. Hester, secy. Dpt P. Wks., rein.-con. sewer in 16th St. between Shotwell and Harrison Sts., to C. C. Haun, 666 Mission St., $49,216 est. $43,000; rein.-con. sewer Visitacion Valley from Schwerin St. to Sunnydale Ave. and Talbert St., to MacDonald & Kahn, Inc., Financial Center Bldg., $25,515 est. $35,000.

Ga., Rockmart—See "Waterworks."

Ill., Bloomfield—Bloomington-Mormal Sanitary Dist., constructing Valley Relief Sewer, 1,600 ft. open cut and 3,225 ft. sewer in tunnel, 66 or 72 in. concrete, segment blocks or monolithic concrete pipe, to J. L. Simmons Co., Inc., Bloomington, $110,000. **P.W.A.**

Minn., St. Paul—Minneapolis-St. Paul Sanitary Dist., 1823 University Ave., constructing interceptor tunnel in Johns St., Contr. 101, Div. C, Job 300, to Feyen Constr. Co., 277 Burgess St., $398,733***Daytons Bluff Tunnel, Contr. 103, Div. A, Job 120, to Middlewest Roads Co., Union Industrial Bldg., Flint, Mich., $449,476. Subject to P.W.A. approval. Bids June 18. Noted June 7.

†*Federal Government.*

Sewerage, etc. (Continued)

N. C., Reidsville—City, constructing sewage treatment plant, tank, sludge beds and appurtenances, to Boyd & Goforth, Builders Bldg., Charlotte, $26,468. Est. $23,000. **P.W.A.** Noted May 10.

N. C., Winston-Salem—P. Wks. Comn. of Bd. Aldermen, sewer extensions Southside Sect., to V. B. Higgins & Co., Kinney Bldg., Charlotte, $206,617. Est. $250,000. **P.W.A.** Bids Apr. 18.

Wis., Footville—City, pipe, valves, hydrants to American Cast Iron Pipe Co., 712 Plymouth Bldg., Minneapolis, Minn., $11,623***disposal plant, tank, etc., to S. A. Hanger, Oxfordville, $9,700***clarifiers, to Link Belt Co., 910 South Michigan Blvd., Chicago, Ill., $822***laying sewe rand watermains, to E. M. Scheflow, Elgin, Ill., $16,744. Grand total $39,019. **P.W.A.** Bids May 8. Noted May 3.

BRIDGES AND GRADE CROSSINGS

PROPOSED WORK

California—C. H. Whitmore, dist. engr. State Hy. Comn., Marysville Hotel, Marysville, returned bids received June 19, unopened, for pier protection for "D" St. bridge in Marysville over Yuba River, consisting of constructing 7 timber sheet piling cofferdams, 40 ft. long, 7 ft. wide, backfilling with gravel and capping with portland cement concrete, Yuba Co. New bids will be asked from revised specifications.

Ia., Sioux City—City Council plans issuing $70,000 bonds for bridge and culvert restoration.

La., Baton Rouge—State Hy. Comn., Baton Rouge, bids about July 1, bridge and approaches over Mississippi River 4 mi. from here. $7,000,000. Harrington & Cortelyou, Dwight Bldg., Kansas City, Mo., engrs. Noted May 3.

Neb., South Omaha—Nebraska Supreme Court approved legality of $1,650,000 revenue bonds issued by City of Omaha to help finance construction of rein.-con., steel toll bridge over Missouri River from South Omaha, Neb., and Council Bluffs, Ia. P.W.A. allotted $1,650,000 loan and grant for project. Noted Apr. 5, under "Contracts Awarded."

BIDS ASKED

Ill., Peoria—July 13, by Dpt. P. Wks. & Bldgs., Div. Hys., rein.-con. box culverts on Sect. 1B-M.F.T., and 44 ft. steel I-beam bridge on Sect. 25B-M.F.T., Peoria Co. G. H. Baker, engr. co. roads and city streets.

Ia., Ida Grove—July 10, by Ida Co., 24 concrete box culverts, and extensions; 35 circular type A culverts, three I-beam bridges on wood pile abutments. G. S. Witters, co. engr.

N. J., Pleasantville—July 16, by State Hy. Dpt., Trenton, constructing railroad bridge over Route 48, Sect. 27, Atlantic Co., incl. 274 cu.yd. found. excav. A. L. Grover, ch. clk.

N. Y., New York—July 11, by J. J. Lyons, pres. Bronx Boro, Bronx County Bldg., 161st St. and Concourse, constructing viaduct in West 205th St. from Navy to Jerome Aves.

†South Carolina—July 12, by U. S. Eng., constructing highway bridge, road approaches, for Little River Bridge at crossing Intracoastal Waterway and U. S. Route 117, between town of Little River and Myrtle Beach.

Ont., London—C. Talbot, engr. Middlesex Co. County Bldg., bids about July 16, new steel bridge over Thames River near Fanshawe, $26,000. Noted Jan. 25.

CONTRACTS AWARDED

Illinois—State Hy. Comn., Springfield, retaining walls, substructure and approach spans for bridge, Cook Co., to L. Balkin Builder, Inc., 1852 West Austin Ave., Chicago, $45,056*** superstructure for same, to Ready Coal & Constr. Co., 205 West Wacker Dr., Chicago, $15,695***approaches to Meredosia Bridge, Pike Co., to P. McGlone, City Bank Bldg., Kansas City, Mo., $8,020***substructure for viaduct, Madison Co., to Superior Concrete Constr. So., 1722 East 56th St., Chicago, $60,981***fabricating steel superstructure for same bridge, to Midland Structural Steel Co., Cicero, $70,734***erecting superstructure for same bridge, to Ben Hur Constr. Co., Springfield, $49,676***substructure for viaduct, Peoria Co., to Thorp-Rogoff Co., 306 South Wabash Ave., Chicago, $46,718***fabricating superstructure, same bridge, to Mississippi Valley Structural Steel Co., Decatur, $37,512***erecting steel superstructure, same bridge, to M. J. McDermott Co., 105 South Dearborn St., Chicago, $45,298. Grand total $379,690. **P.W.A.** Bids Jan. 26 and June 19. Noted June 14.

Ill., Springfield—Dpt. P. Wks. & Buildings, Div. Hys., Springfield, for Sangamon Ave. Subway, incl. sidewalk, sewers, manholes, retaining walls, paving, to J. L. Simmons Co., Inc., 101 North 5th St., $128,000. **P.W.A.** Bids June 20. Noted June 14.

Indiana—State Hy. Comn., Indianapolis, 2 steel beam bridges in Jackson Co., to Vincennes Bridge Co., Vincennes, $57,553 est. $76,935***2 rein.-con. arch bridges in Marion Co., to J. C. Jarrett & Son, Lynn, $19,455 est. $25,745. **P.W.A.** Bids June 12.

Michigan—State Hy. Dpt., Lansing, N.R.H.B1 of 51-10-6C-2, Manistee Co., steel cantilever design deck trusses, two 125 ft. anchor, two 125 ft. cantilever and one 50 ft. suspended center truss spans, 2 rein.-con. frame abutments and 2 rein.-con. piers, to Wisconsin Bridge & Iron Co., 5023 North 35th St., Milwaukee, Wis., $122,466***N.R.H.-B1 of 79-14-2, Contr. 1, Tuscola Co., three 55 ft. steel deck girder type spans, etc. to C. A. Handeyside Constr. Co., 11-169 General Motors Bldg., Detroit. **P.W.A.**

†Montana — U. S. Eng., Postal Telegraph Bldg., Kansas City, Mo., constructing left bank trestle for upstream toe of Fort Peck Dam, to Morris-on-Glasscock and Connor Constr. Co., Midland Bank Bldg., Kansas City, Mo., $143,719. Bids June 15. Noted June 7.

†Neb., David City—Treas. Dpt. at office Sup. Archt., Wash., D. C., post office, to Busboom & Rauh, Salina, Kan., $37,000. Bids June 12. Noted May 31.

New Jersey — State Hy. Comn., Trenton, bridge in Warren Co., to Franklin Contg. Co., 20 Washington Pl., Newark, $56,764. Bids June 18. Noted June 7.

Pennsylvania—At office S. S. Lewis, secy. Hys., Harrisburg, 746 ft. plate girder overhead bridge and bit. penetration surfacing, 20 ft. wide, R.588, Chambersburg Boro, Franklin Co., to Graham Constr. Co., 261 Woolworth Bldg., Lancaster, $38,133. Bids June 15. Noted June 7, under "Streets and Roads."

Texas—G. Gilchrist, state hy. engr., Austin, constructing 3 rein.-con. bridges, Hy. 7, S.P. 947-E, Mills Co., to Monarch Eng. Co., P. O. Box 962, San Antonio, $22,624 est. $20,000 ***Medina River Bridge, Hy. 66, S.P. 461-B, Bexar Co., to Cage Bros., Bishop, $158,014 est. $160,000***4 trestle bridges, Hy. 8, S.P. 277 Rev. and 1082, Shelby and Panola Counties, to E. W. Hable, Corsicana, $84,224 est. $80,000. Grand total $264,862. Bids June 18.

Texas—G. Gilchrist, state hy. engr., Austin, constructing 2 rein.-con. bridges, Hy. 3, N.R.M. 213-C, Val Verde Co., to M. H. Ryland, Uvalde, $24,010. Est. $40,000. **P.W.A.** Bids June 18.

Wis., Fond du Lac—City, new concrete abutments for bridge, to Fluor Bros. and Smith, Oshkosh, $8,448; steel bridge, to Vulcan Mfg. Co., Fond du Lac, $14,997. W. A. Coffman, Fond du Lac, clk.

Wyoming—See "Streets and Roads."

Ont., North Bay—Dpt. Northern Development, Toronto, S. S. Smith, engr., Parliament Bldg., Toronto, bridge consisting of one 90 ft. and four 95 ft. rein.-con. abutments, steel spans over Calamity Gulch, to Leitch Constr. Co., 32 Belsize Dr., Toronto.

STREETS AND ROADS

BIDS ASKED

†Colo., Fort Lyon—July 24, by Vet. Bu., Arlington Bldg., Wash., D. C., resurfacing roads at U. S. Vet. Administration Facility.

Connecticut—July 9, by State Hy. Comn., J. A. Macdonald, state hy. engr., Hartford, rolled bank run gravel surfacing 8,350 ft. Parish Hill and Pumpkin Hill Rds., Chaplin; 6,530 ft. Erdoni Rd., Columbia; 7,377 ft. North West Corner School Rd., Wm. Miller and Old Jewett City Rd., Preston; 8,185 ft. Jared Brown Rd., Stonigton; 7,581 ft. Beaver Hill and Love Lane Rds., Windham; loose gravel surfacing 9,175 ft. Hampton Hill and Brook Rds., Hampton; foregoing Town Aid Projects; bituminous macadam paving 1½ mi. Killingworth Rd., Route 148, Chester; waterbound macadam paving 2 mi. Route 183, North Colebrook and Norfolk Rds., foregoing Trunk Line Federal Projects; waterbound macadam paving 2 mi. Bushy Hill Rd., Route 167, Simsbury, State Aid Project. To exceed $25,000.

†D. C., Wash.—July 17, by Treas. Dpt. at office Sup. Arch., Wash., D. C., developing triangle, incl. grading, walks, sprinkler system, etc.

Georgia—July 12 (extended date), by W. E. Wilburn, State Hy. Dpt., **Atlanta, improving hys.**

Ill., Taylorville—July 10, by Dpt. P. Wks. & Buildings, Div. Hys., concrete paving 1.9602 mi. Sect. 4-1, M.F.T., Christian Co. G. H. Baker, engr. co. roads and city streets.

Indiana—July 10, by State Hy. Comn., Indianapolis, bituminous concrete or rock asphalt paving 0.042 mi. State Rds. 41 and 50, Vincennes, N.R.M. Project 78-H, Knox Co.; rein.-con. paving 0.397 mi. State Rd. 41, N.R.M. 69-G, Lake Co.; concrete, brick, bituminous concrete on concrete base, bituminous macadam on macadam base or rock asphalt on macadam paving 1.961 mi. State Rd. 18, Carroll Co.; grading, structures crushed run stone surfacing 5.11 mi. State Rd. 52, Contr. S-922, Franklin and Dearborn Counties; 14.297 mi. State Rd. 18, Benton and White Counties; structure extensions 19.74 mi. State Rd. 9, and 3.4 mi. State Rd. 46, S-915, Bartholomew, Shelby and Decatur Counties; 9.97 mi. State Rd. 26, Tippecanoe Co.; 8.4 mi. State Rd. 26, Blackford Co.; 18.25 mi. State Rd. 27, Adams and Allen Counties; 10 mi. State Rd. 31 Johnson Co.; 4.91 mi. State Rd. 35, Johnson Co.; 10.6 mi. State Rd. 60, Jennings Co. J. I. Adams, chn.

Ia., Rock Rapids—July 12, by Lyon Co. graveling 20 mi. secondary road. E. B. Carson, co. engr.

Louisiana—July 17, by State Hy. Comn. Baton Rouge, grading, drainage structure 10.256 mi. White Castle-Donaldsonville Rd., Project 3301-A, N.R.S. 225, Iberville and Ascension Parishes, involving 3,600 cu.yd. drainage and 6,887 cu.yd. roadway excav.; constructing Tchefuncta River Bridge and West Approach 0.126 mi. hy., Madisonville, Project 960-C, N.R.S. 233, St. Tammany Parish.

Maryland—July 10, by State Roads Comn., Baltimore, sheet asphalt and concrete surfacing 0.5 mi. along Loch Raren Blvd. Ext. from Baltimore City Line toward Taylor Ave., Contr. B-307-42, Baltimore Co.; concrete surfacing, combination curbing, gutters, sidewalks for widening Market St. in Pocomoke, Contr. Wo. 144-1-111, Worcester Co.

Massachusetts—July 10, by Commonwealth of Massachusetts, Dpt. P. Wks., F. E. Lyman, comr., 100 Nashua St., Boston, bituminous macadam paving 48,148 ft. N.R.A. Project R-26, Docket 5285, Route 2, Charlemont. $461,000. P.W.A. loan and grant.

New Hampshire—July 12, by State Hy. Dpt., Concord, 4 in. on 11 in. gravel paving 4.716 mi. Connecticut Valley Rd., Sullivan Co. $75,000. C. P. Riford, Concord, engr.

†New Jersey—July 12, by Dpt. Agriculture, Pub. Rds., at office Acting Superintendent Morristown Natl. Historical Park, Morris Co., improving 1.72 mi. Jockey-Hollow Rd. and portion Sugar Loaf Rd., Morristown Natl. Historical Park. H. J. Spelman, principal hy. engr.

N. Y., New York—July 11, by J. J. Lyons, pres. Bronx Boro, Bronx County Bldg., 161st St. and Concourse, grading, sidewalks, drains, culverts in Pelham Parkway, East 232nd St., Secor, Steley, Arnow, Edson, Tiemann, Cranford, Waring, Chatterton, Barker, Adee Aves.

N. Y., St. George—July 11, by J. A. Palma, pres. Richmond Boro, Boro Hall, bituminous concrete repaving roadways Morningstar Rd. and Elizabeth St.; temporary sanitary sewers in Crafton Ave.

North Dakota—July 20, by State Hy. Comn., Bismarck, furnishing and applying cutback asphalt on 12 mi. Casselton Rd. N., Project 267-A-1316, Cass Co.; 15 mi. Wahpeton Rd. S., Project 4 Pt. and 4B-1317, Richland Co. 2.419 mi. road south of Fargo, Project 285C-1314-1-1315, Cass and Richland Counties; regraveling and stock pile 27.517 mi. Hamilton to Grafton, Projects 293-A-1310 and 293B-1311, Pembina and Walsh Counties. F. A. Vogel, hy. comr.

Ohio—O. W. Merrell, dir. Hys., Columbus, cancelled bids to have been opened June 29, for surface treating with surface course road mixed using slag, stone or gravel surfacing 11.65 mi. hys. Ashtabula, Geauga and Trumbull Counties, $70,155***bituminous surface course, road mixed slag or sand and gravel surfacing 3.55 mi. hy. Clermont Co., $8,581***bituminous surface treating 58.07 mi. Geauga, Portage, Stark and Summit Counties, $36,239***bituminous surface course road mixed surfacing 15.3 mi. Mercer and Miami Counties $52,489. Noted June 21.

Ohio—O. W. Merrell, dir. hys., Columbus, did not receive bids June 22 for adjusting present catch basins and manholes and hotlaid asphaltic concrete resurfacing present pavement on 0.79 mi. Sect. "Delphos" Findlay-Delphos Rd. and Sect. "Delphos" Van Wert-Delphos Rd., Allen Co.***concrete paving 2,017 ft. new road, and widening, hot laid or cold laid asphaltic concrete paving road and constructing concrete beam bridge over Dry Run, 4,688 ft. road, on Sect. "I" (part) Columbus-Wooster Rd., Knox Co., $66,181***concrete widening 0.303 mi. Sect. "F" Cincinnati-West Union Rd., Hamilton Co., $35,685. O. W. Merrell, dir. Hys., Columbus, cancelled bids which were received on June 22, bituminous surface treating 42.28 mi. hys. in Henry, Williams and Wood Counties, $27,648; 20.6 mi. hys. Harrison, Guernsey and Belmont Counties, $18,792; 26.333 mi. hys. Ashland and Crawford Counties, $23,881; 26.76 mi. hys. Muskingum, Coshockton and Knox Counties, $45,379; 21.26 mi. Perry and Fairfield Counties, $28,052; 16.53 mi. hys. Clermont and Brown Counties, $18,838*** 35.8 mi. Clark, Darke and Mercer Counties, $29,048; 32.14 mi. Madison, Pickaway, Marion and Wyandot Counties, $26,235. Noted June 14.

Pennsylvania—July 13, at office S .S. Lewis, secy. Hys., Harrisburg, rein.-con. paving, 6,059 ft. R-43-43 County-Aid Appl. 9477, Mercer Co.; 2 span steel truss and through plate girder bridge, rein.-con. paving 1,816 ft. R-68, Sect. 9, Blairsville Borough, Derry Twp., Indiana and Westmoreland Counties, involving 6,694 cu.yd. Class 1, 3,611 cu. Class 2, and 26,247 cu.yd. borrow excav.

R. I., Providence—July 9, by City, Bd. Contr. & Supply, City Hall, bituminous macadam paving several miles Pocassett and Douglas Ave., Althea, Ashton and Barstow Sts. To exceed $25,000.

†*Federal Government.*

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Streets and Roads (Continued)

Wash., Walla Walla—Comrs. Walla Walla Co., rejected bids June 18, constructing 4 mi. and reconstructing 5 mi. Touchel Rd. $75,000. E. R. Smith, Walla Walla, engr.

Wisconsin — July 11, by State Hy. Comn., Madison, grading, draining, concrete structures 4.513 mi. Randolph-Junction S.T.H. 23, S.T.H. 73, N.R.H. 351-D, Lake Co., incl. 105,219 cu. yd. earth, borrow and marsh excav., 1,903 cu. yd. loose and 4,929 cu.yd. solid rock excav.; grading, draining 14.163 mi. Eagle River Alvin Rd., U. S. Forest Hy. Project E.N.R. 1-A, 189,328 cu.yd. earth, borrow and channel excav., 1,600 cu.yd. loose and 285 cu.yd. solid rock excav.; graveling 11,067 cu.yd. Randolph-Junction Rd., S.T.H. 73, N.R.H. 351-D, Green Lake Co.; 220,000 gal. bituminous materials on 20 mi. Armstrong Creek-Florence Rd., State Trunk Hy. 101, State Aid Project 7978, Florence Co.; constructing 14th Street Overhead, on U. S. Hy. 141, N.R.M. 420-C, Sheboygan Co., 1,900 cu.yd. earth excav.; Ramthum Bridge, S.T.H. 28, State Project 2270, Washington Co.

†**Wyo., Sheridan**—July 10 (extended date) by Vet. Bu., Arlington Bldg., Wash., D. C., resurfacing roads.

CONTRACTS AWARDED

†**Calif., Los Angeles**—Vet. Bu., Arlington Bldg., Wash., D. C., roads at U. S. Veterans Administration Facility, to T. E. Schafer, 406 North Rampart St., Los Angeles, $28,499; storm drains at cemetery, to Martter & Bock, 1007 South Harvard Blvd., $24,950.

Georgia—State Hy. Bd., Atlanta, to Davis, Miller & Rutherford, Tampa, Fla., paving 2.5 mi. Irwinton-Macon Rd., Wilkinson Co., $45,782; 1.694 mi. Dublin-Wrightsville-Sandersville Rd., Johnson Co., $31,120; 5.613 mi. Columbus-Macon Rd., Crawford Co., $71,511***to Whitley Constr. Co., La Grange, 9.49 mi. Fort Valley-Barnesville Rd., Lamar Co., $153,048; 12.838 mi. Thompson-Washington Rd., Wilkes and McDuffie Counties, $215,401***to M. J. Carroll, Inc., Ocala, Fla., 2.978 mi. Fort Gaines-morgan Rd., Calhoun Co., $37,898***to Espy Paving & Constr. Co., 2821 Bull St., Savannah, 0.845 mi. Statesboro-Savannah Rd., Chatham Co., $30,949***to J. W. Gwin Co., Inc., Comer, Bldg., Birmingham, Ala., 4.779 mi. Abbeville-Hawkinsville Rd., Wilcox Co., $33,277***to Claussen-Lawrence Constr. Co., Augusta, 0.715 mi. Buchannan-Rome Rd., Polk Co., $26,613***to R. W. Bryan & Co., Jasper, Fla., 2.251 mi. Alapaha-Ocilla Rd., Irwin Co., $34,776***to Hipp & Sims, Powder Springs, 3.735 mi. Nahunta-Jesup Rd., Brantley Co., $35,653***to W. C. Shepherd, 347 Elizabeth St. N. E., Atlanta, grading, 1 culvert type bridge, 2.836 mi. Lincolnton-Augusta Rd., Columbia Co., $28,227***to C. T. Feliz, St. Petersburg, Fla., constructing 1 bridge, Alapaha-Oscilla Rd., Irwin Co., $4,791***to A. Lyons, Rogersville, Tenn., 2 bridges, Abbeville-Hawkinsville Rd., Wilcox Co., $6,054. Grand total $755,100. **P.W.A.** Bids June 7. Noted June 7.

Ill., Chicago—Dpt. P. Wks. & Buildings, Div. Hys., concrete paving 2.4563 mi. road near Arlington Heights, Cook Co., to E. A. Meyer Constr. Co., Glencoe, $93,690.

Ill., Danville—State Dpt. P. Wks. & Buildings, Div., Hys., Springfield, concrete paving 2.511 mi. road near Meeks Station, Vermilion Co., to A. F. Adams, Champaign, $29,096.

Ill., Marion—State Dpt. P. Wks. & Buildings, Div. Hys., traffic bound surface course 3.6712 mi. road, Williamson Co., to Barnett & McCoy, Carbondale, $31,105.

Indiana—State Hy. Comn., Indianapolis, bitum. retread surfacing 2.671 mi. Johnson Co., to L. P. Cavett Co., Lockland, O., $22,313. Est. $28,024. Bids June 12. Noted June 7.

Indiana—State Hy. Comn., Indianapolis, grading, crushed stone surfacing 7,554 cu.yd. Perry Co., to Foulkes Constr. Co., Terre Haute, $33,221. Est. $39,951. June 12. Noted June 21.

Ia., Sioux City — Woodbury Co., grading roads, to W. H. Dugan, Omaha, Neb., $21,644***and to W. Mauch, Ida Grove, $3,708 ***4 rein.-con. culverts, to H. Noel, Peterson, $2,919. Grand total $28,270. Bids June 18. Noted June 12.

Kentucky—State Hy. Comn., Frankfort, surface mix surfacing 4.4 mi. Lexington-Richmond Rd., Project 5-1-1-SM and 9.443 mi. same road, Project 5-I-SM, to R. B. Tyler Co., 1446 Levering St., Louisville, $27,767 and $46,939 respectively***3.428 mi. Lexington-Versailles Rd. Project 20-F-1-SM, to N. W. Gorham Co., Lexington, $14,286, all foregoing projects in Fayette Co. Grand total $88,992. Bids June 15. Noted June 7.

Kentucky—State Hy. Comn., Frankfort, grading, draining 7.835 mi. Round Hill-Caneyville Rd., S. P. 1204-AG, Edmonson and Butler Counties, to Ruth Bros., Frankfort, $66,328. Bids May 24, awarded June 26. **P.W.A.** Noted May 3.

Kentucky—State Hy. Comn., Frankfort, grading, draining 7.7 mi. Scottsville-Franklin Rd. Allen Co. and 9.7 mi. Birmingham-Benton Rd., Marshall Co., to Wood & Barton, Inc., Frankfort, $36,867 and $43,356 respectively***0.6 mi. street in Catlettsburg, Boyd Co. to Longhorne & Longhorne, Huntington, W. Va., $33,260***6.9 mi. Mayfield-Lowes Rd., Graves Co., to McDade & McDade, Fulton, $54,410***2.8 mi. Burna-Hampton Rd., Livingston Co., to R. E. Mills Co., Frankfort, $25,967***8.6 mi. Greenville-Hopkinsville Rd., Muhlenberg Co., to J. F. Mulligan, Leitchfield, $59,921***11.7 mi. Williamsburg-Pineville Rd., Whitley Co. and traffic limestone surfacing 8.8 mi. Manchester-London Rd., Clay Co., to Kentucky-Virginia Stone Co., Middlesboro, $173,640 and $52,321 respectively***concrete paving 4.2 mi. Louisville-Elizabethtown Rd., Jefferson Co., to W. C. Halstead, Indianapolis, Ind., $120,339***0.4 mi. street in Richmond, Madison Co., to Carey-Reed Co., Lexington, $25,893***creek or bank gravel surfacing 4.3 mi. Bradfordsville-Mannsville Rd., Marion Co., to Nally & Mudd, Springfield, $12,104***bit. surfacing LO and ACB, on 3.4 mi. Mt. Sterling-Frenchburg Rd., Montgomery Co., to Gay-Coleman Constr. Co., Ashland, $58,349***concrete paving 4.5 mi. Carlisle-Millersburg Rd., Nicholas Co., to Wilmore Paving Co., Middletown, O., $117,724***13.6 mi. Pine Knot-Wiliamsburg Rd., Whitley and McCreary Counties, to D. L. Walker & Co., Lexington, $84,709. Grand total $898,860. **P.W.A.** Rejected bids traffic limestone surfacing 9.3 mi. Somerset-Russell Springs Rd., Pulaski Co.; 3.8 mi. Russell Springs-Somerset Rd., Russell Co.; 3.8 mi. Russell Springs-Columbia Rd., Russell Co. held in abeyance grading, draining 1.8 mi. Central City-Kinchloe Ferry Rd., S. P. 404-A-G, Muhlenberg Co. grading, draining 5 mi. Brownsville Morgantown Rd., Butler Co. Noted May 25 and June 7.

†**Md., Perry Point** — Vet. Bu., resurfacing roads, U. S. Veterans Facility, to H. T. Campbell & Sons, Towson, $19,900. Bids June 19. Noted June 7.

Massachusetts—Commonwealth of Massachusetts, Metropolitan Dist. Comn., D. B. Keniston, comr., 20 Somerset St., Boston, bituminous macadam paving ¾ mi. Charles River Rd. from North Beacon St. westerly, Watertown, to John P. Condon Corp., 143 Waverly Ave., Watertown, $31,633. Bids June 21, awarded June 23.

Mo., St. Louis—Bd. P. Serv., roughened asphalt repaving 13th St. and paving Haven St. to Perkinson Bros. Constr. Co., 3237 Carter Ave., $5,862 and $39,732 respectively***repaving Pine St., to Stier Bros. Constr. Co., Garrison Ave. and Magazine St., $25,355. Grand total $70,949. **P.W.A.** Bids May 22 and 29. Noted May 17.

Montana—State Hy. Comn., Helena, grading, surfacing, oil treating NRM-225 in Shelby and grading, graveling, drainage structures NRS-308-B, Fallon Co., to F. J. Haas, Harrison, $25,509 and $11,893 respectively***improving NRM-245-F, 325-A, NRS-327, Unit 1, Richland Co., to A. LaLonde, Bainville, $52,450*** grading, graveling, oil treating NRM-253-D, in Wolf Point to Hargrave Constr. Co., Cedar Rapids, Ia., $12,271***widening 2 bridges NRH-82-C, Unit 2, Gallatin Co., to B. M. Crenshaw, Livingston, $9,633***bridge on NRS-327, Unit 2, Richland Co., to H. E. Nesbitt, Miles City, $3,232. Grand total $114,996. **P.W.A.** Bids June 22. Rejected bids grading, graveling, oil treating Mineral Ave. in Libby, 7th Ave. N., Bozeman, and 1st Ave. through Chinook; received no bids oil treating NRM-193-F, Unit 2, in Plentywood. Noted June 21.

New Jersey—State Hy. Comn., Trenton, grading, rein.-con. paving 26,900 cu.yd. Union Co., to Nesto Contg. Co., 149 Verona Ave., Newark, $32,374. Bids June 18. Noted June 7.

North Dakota—State Hy. Dpt., Bismarck, to A. J. McKibbon, Lancaster, Minn., grading 4.108 mi. Cavalier Co. $11,816***to Dowd Bros., Clark, S. D., 9.966 mi. Dickey Co. $25,236; 9.329 mi. Emmons Co. $22,252; 6.712 mi. Emmons Co. $17,768***to Mayo & Martineau, Cavalier, 6.604 mi. Pembina Co. $19,277***to Butler Constr. Co., Grand Forks, graveling 3.927 mi. Foster Co. $2,393; grading 13.212 mi. Wells Co. $15,909; 9.283 mi. Wells Co. $14,710; 8.734 mi. Wells Co. $9,494***to Dickinson Ice & Transfer Co., Dickinson, landscaping 0.151 mi. Billings Co. $5,395***to J. Simons, Mandan, structural work in Emmons Co. $6,545***to T. M. Swingen, Cooperstown, in Richland Co. $18,771***to Strom Constr. Co., Moorhead, Minn., grading 11.575 mi. Richland Co. $27,263***to Graham Asphalt, Inc., Des Moines, Ia., paving 0.573 mi. Renville Co. $13,159; 0.602 mi. Rolette Co. $14,381; 2.009 mi. Dickey Co. $31,650; 1.022 mi. McIntosh Co. $15,692; 1.003 mi. McIntosh Co. $17,770***to Magarry Bros., Bismarck, 1.217 mi. Stark Co. $20,815***to S. Birch & Sons, Fargo, 0.948 mi. Cass Co. $34,793***to J. L. McCormick, Fargo, 0.975 mi. Richland Co. $39,421 **P.W.A.** Grand total $384,510. Bids June 22. Rejected bids June 22, roads in Hettinger, Burke, Burleigh, Pembina and Walsh Counties. Noted June 14.

North Dakota—State Hy. Dpt., Bismarck, to T. W. Swingen, Cooperstown, paving 0.696 mi. Pembina Co. $26,463***to C. L. Lindberg, Jamestown, 0.6 mi. Cavalier Co. $21,486*** to W. Coman, Goodrich, grading 15.322 mi. Eddy Co. $41,702; 9.036 mi. Kidder Co. $16,727; 9.036 mi. Kidder Co. $11,477; 5.042 mi. Nelson Co. $11,754***7.411 mi. Towner and Ramsey Counties $20,173; 11.462 mi. Towner Co. $31,518***to Jordan & Eylofson, Hensel, structural, etc., Eddy Co., $2,659. Grand total $183,959. Bids June 22. Noted June 14.

Pennsylvania—At office S. S. Lewis, secy. Hys., Harrisburg, rein.-con. paving 0.49 mi. Route 146, Mt. Penn and St. Lawrence Boroughs, Berks Co., to C. W. Good, 726 Columbia Ave., Lancaster, $30,075. 100% state***6 span, structural steel, rein.-con. overhead bridge, 375 ft. grading, on Spur B, Route 281, parallel, Sect. 3 and Spur B, Middletown Twp., Bucks Co., to Yeo Constr. Co., Chestnut Hill, $149,504 **P.W.A.***rein.-con. paving 1.66 mi. and 1 rein.-con. bridge, replacing wearing surface and resurfacing existing brick pavement with Spec. "E" Route 11012 Sect. R-1, and R-2, city of Johnstown, Stony Creek and Richland Twps., Cambria Co., to C. H. Ressler, $52,396, **P.W.A.**, Grand total $231,977. Bids June 15. Noted June 7.

Tennessee—State Dpt. Hys., & P. Wks., Nashville, grading, draining 3.252 mi. Hy. 76, N.R.S.274-A, Henry Co., to Lebanon Bridge Co., Sam Davis Hotel, Nashville, $35,484*** constructing bridge over M. and O. R.R., State Hy. 100, at Henderson, N.R.M.214-E, Chester Co., to Forcum James Co., Dyersburg, $44,045 ***grading, drainage, paving approaches to above bridge, to Zeigler Constr. Co., 803 American Trust Bldg., Nashville (sub-contractor)*** constructing bridge over Collins River on State Hy. 56, N.R.S.275-B, Grundy Co., to Bell & Bell, 203 8th Ave. N., Nashville, $34,804*** grading, drainage Hy. 69, N.R.S.407-A, Hardin Co., to T. M. Strider & Co., Cotton States Bldg., Nashville, $36,000. Grand total $150,334, **P.W.A.** Bids June 23, awarded June 23. State Dpt. Hys. & P. Wks., withdrew project for construction of bridge and approaches, Hy. 52, N.R.S.404-A, Clay Co. Noted June 14.

Texas—G. Gilchrist, state hy. engr., Austin, grading, drainage structures, M. B. C. culverts over 20 ft. span, limestone rock asphalt on caliche base course paving 2.569 mi. State Hy. 3, Val Verde Co., to Brown & Route, Colorado St., Austin, $74,635, est. 80,000. **P.W.A.** Bids June 18.

Texas—G. Gilchrist, state hy. engr., Austin, grading, drainage structures, 12.57 mi. State Hy. 8, Shelby and Panola Counties, to J. S. Moore Sons, Lufkin, $140,122 est. $160,000 ***8.271 mi. State Hy. 9, McCulloch Co., to Allhands & Davis, 501 Southwestern Life Bldg., Dallas, $58,421 est. $68,000***9.866 mi. State Hy. 7, Miles Co., to L. J. Miles, 1809 Clover Lane, Fort Worth, $51,453 est. $60,000***double and triple bituminous surface treatment with road oil prime coat surfacing 12.493 mi. State Hys. 106 and 94, Trinity Co., to R. W. McKinney, Nacogdoches, $38,225 est. $46,000***double asphalt surface treating 11.364 mi. State Hy. 71, Colorado Co., to Haden & Austin, 414-415-1st Natl. Bank Bldg., Houston, $26,893 est. $26,000***plant mixed asphaltic concrete on caliche base course paving 4.01 mi. State Hy. 3, Val Verde Co., to J. Lee and E. A. Vilbig, 2517 Eakin St., Dallas, $52,846 est. $40,000 ***grading, drainage structures, double asphalt surface treating 12.896 mi. State Hy. 1 and 196, Jeff Davis and Reeves Counties, and single bituminous on caliche base course surface treating 12.54 mi. State Hy. 81 and 27, Kerr Co., to L. E. Whitham & Co., P. O. Box 605, Wichita Falls, $75,054 and $31,715 respectively est. $114,000 and $40,000 respectively***triple asphalt surface treating 5.224 mi. State Hy. 24, Hunt Co., to Public Constr. Co., Denton, $19,295 est. $22,400. Grand total $494,024. Bids June 18.

Wash., Seattle—King Co., grading, concrete paving 1 mi. J. L. Sharpe Co. and 1.36 mi. Woodinville-Duvall Rd., to Northwest Constr. Co., 202 West 52nd St., $23,455 and $35,552 est. $27,000 and $35,000 respectively***9,051 sq.yd. Renton-Three Tree Point Rd., to J. B. Covello, 1510 Sturges Ave. S., $21,831 est. $20,000. Grand total $80,838. Bids June 25. Noted June 14.

Wash., Seattle—Comrs. King Co., clearing, grubbing grading, concrete paving 0.94 mi. East 145th St., to N. Fiorito, 8460 West 48th St., $25,142. Bids June 18. Noted June 7.

Wyoming—State Hy. Dpt., Cheyenne, oil treating 1.916 mi. road in Unita Co., to Woodward Constr. Co., Rock Springs, $26,746*** grading, draining oil treating 2.102 mi. and bridge group, in Albany Co., to M. E. Carlson, 4483 Newton St., Denver, Colo., $39,248 and $7,228***underpass and approaches Campbell Co., to B. Dean, Sheridan, $35,609. Grand total $108,831. **P.W.A.** Bids June 22.

†**Wyoming**—Pub. Rds., Denver, Colo., grading, bridging, surfacing 17 mi. Centennial-Saratoga Forest Hy., to M. E. Carlson, 4483 Newton St., Denver, Colo., $101,928. Bids June 15. Noted June 7.

Ontario—Dpt. Hys., Parliament Bldgs., Ottawa, concrete paving 5.25 mi. hy. from Walkerton to Hanover, Contr. 34-51, to Dufferin Paving & Crushed Stone Ltd., Fleet St. W., Toronto***tile drainage on 6.91 mi. Chatsworth South, Contr. 34-58, to Standard Paving Ltd., Harbor Comn. Bldg., Toronto***tile drainage on 9.2 mi. hy. Elginfield to Ailso Craig, Contr. 34-61, to C. S. Parker, 389 Hale St., London***tile drainage on 10. mi. St. Thomas to Aylmer, Contr. 34-63, to Frank Elliott, Woodstock.

EARTHWORK, IRRIGATION DRAINAGE AND WATERWAYS

PROPOSED WORK

Calif., San Jose—Santa Clara Valley Conservation Dist., Grant Bldg., voted bonds to finance structures for impounding and distributing flood waters for irrigation (district has applied to P.W.A. for supplementary grant of $683,000 which will be available when bonds are voted); project involves 15 deten-

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†*Federal Government.*

Earthwork, etc. (Continued)

tion reservoirs, Coyote, $512,000, Calero, $339,000, Alameda, $214,000, Guadalupe, $330,000, Stevens, $412,000, 6 percolating reservoirs, costing $198,000 and 5 spreading dams, $58,000, connecting conduits, incl. canals and tunnels, $324,000. Est. $2,000,000. F. H. Tibbetts, Alaska Comm. Bldg., San Francisco, engr. Noted June 7.

Idaho, Shoshone—Big Wood Canal Co. making plans new outlet works to reservoir, 11 ft. diam. outlet pipe, gate valves and gate house. $18,000 allotted by P.W.A. Bureau Reclamation supervising work.

†Ore., Portland—U. S. Eng., Custom House, soon takes bids exploration drilling at Ruckel Slide between Eagle Creek and Cascade Locks, involving 1,000 lin.ft. overburden and rock drilling. No bids presented at June 23 opening.

Wash., Aberdeen — City Council approved plans diking project. $495,000. S. C. Watkins, city engr. Will seek federal funds.

Wash., Tacoma—Pierce and King Counties plans constructing flood control, incl. dam on White River, above Buckley. B. P. Thomas, inter-county river engr. Will seek $2,000,000 federal allotment for project.

BIDS ASKED

†Mich., Escanaba—July 16, by Superintendent Lighthouses, Milwaukee, Wis., 64x64 ft. substructure and 29½x29½ ft. superstructure steel plate and channel belt, with cork and plaster, cellized wood floor, insulation steam heating, oil burner, 4 in. concrete slab roof waterproof tower 10 ft. sq. and 40 ft. 8 in. high, steel plate and angle frame construction, at Minneapolis Shoal Light Station near here and one at Grays Reef Light Station.

N. Y., Brooklyn—July 10, by Dpt. Docks, J. McKenzie, comr., Pier A, foot Battery Pl., New York, dredging at bulkhead between Vandam and Apollo Sts., Newtown Creek, and at bulkhead 640 ft. south of Hamilton Ave., on easterly side of Gowanus Canal. Contr. 2099.

†Wis., Milwaukee—July 19, by Superintendent Lighthouses, constructing circular steel substructure steel sheet piling, 50 ft. diam., circular superstructure 25 ft. diam., tower, 35 ft. 9 in., for Peshtigo Reef Light Station; and circular caisson construction 50 ft. diam., etc. for Green Bay Outen Light Station.

New Brunswick—July 17, by Secretary Dpt. P. Wks., Ottawa, Ont., extending breakwater at Escuminac, $34,000; also breakwater-wharf, at Whale Cove, $12,000. K. M. Cameron, Ottawa, Ont., engr.

Nova Scotia—July 9, by Secretary Dpt. P. Wks., Ottawa, Ont., deepening dock and basin at the Mersey Papes Co. Ltd., Brooklyn, $24,000***July 12, extension to breakwater, Broad Cove, $12,500***wharf extension, involving 59,000 cu.yd. cribwork in place fully ballasted, Meteghan, $26,000***July 13, breakwater extension, 72,000 cu.ft. cribwork, 10,000 ft. B. M. 4 in. sheathing in place, and removing old existing pilework, North West Cove, $12,000; wharf extension, 130,000 cu.ft. cribwork, 33,000 ft. B. M. hardwood sheathing, etc., Malagash, $24,000***July 17, breakwater extension, Lackeport, $22,000; repairs to piers, Grand Etong, $10,000***July 18, breakwater extension, Port Grenville, 57,000 cu.ft. cribwork, etc. $8,200. K. M. Cameron, Ottawa, Ont., engr.

Ontario—July 10, by Secretary Dpt. P. Wks., Ottawa, rubble mound breakwater, involving 150,000 cu.yd. natural deposits core stone, 22,000 cu.yd. quarry run core stone, 20,400 tons cover stone. Port Arthur, $200,000; pier and revetment wall, 142,577 lb. steel sheet piling, 6,608 lb. structural steel, 2,218 lb. anchorage, 703 lb. machine bolts, 7,680 lb. steel rail fenders. Port Stanley, $28,000*** July 11, sheet pile revetment wall, 34,000 cu. yd. excav., 14,612 ft. B. M. timber, 17,982 lb. anchor rods, 23,982 lb. bolts, and 8,490 lb. reinforcing steel. Port Burwell, $20,000; roadway, LaSalle Causeway, Kingston, $20,000; piers, floats and pile cluster, 22,400 lb. steel sheet piles, 6,200 lb. fabricated steel, 1,800 lb. tie rods, and 4,200 lin.ft. road timber. Hamilton, $40,000***July 12, revetment wall section, 3,100 ft. B. M. timber, 250,500 lb. steel sheet piling, 350 cu.yd. excavating, 12,300 lb. anchor rods, 1,900 cu.yd. fill, 2,700 ft. B. M. hardwood fenders, Kincardine, $18,000. K. M. Cameron, Ottawa, engr.

Quebec—July 10, by Secretary Dpt. P. Wks., Ottawa, Ont., wharf repairs at Cap de la Mageleine, $23,500; also new wharf at Port Daniel East, $23,300***July 18, keel blocks, 1-200 cast iron, 552,000 lb. $1,900; also wharf repairs, 3,100 cu.yd. heavy stone revetment, 250 lin.ft. stone coping, at Manicouagan, $15,000. K. M. Cameron, Ottawa, Ont., engr.

CONTRACTS AWARDED

†Calif., Newport Beach—U. S. Eng., constructing 2,775 ft. new enrockments and reconstructing 1,400 ft. existing reenrockments at entrance to Newport Bay, to Rohl-Connolly Co., 4251 Alhambra Ave., Los Angeles, $557,790. Bids May 28.

La., Monroe—Bd. Comrs., Tensas Basin Levee Dist., Chavin Bayou flood gates on left bank of Ouachita River, Ouachita Parish, at Station 69+00 of Monroe-Sterlington New Levee, consisting of laying three lines of 60 in. corrugated iron pipe, 789 lin.ft., building concrete structures and placing flood gates, to Forcum-James Co., Monroe, $25,262***River Styx Flood Gate, at Station 239+83, Monroe-Sterlington New Levee, laying one 72 in. corrugated iron pipe line, 286 lin.ft., concrete structures, placing flood gates, etc., and Lonewa Bayou Flood Gates, Station 392+62 Monroe-Sterlington New Levee, three 60 in. corrugated iron pipe lines, 984 lin.ft., building concrete structures, etc., to Levassuer & Netherton, Shreveport, $12,834 and $30,248 respectively. Grand total $68,344. Bids June 14, awarded June 18.

†Missouri, Mississippi, Kentucky and Arkansas—U. S. Eng., Memphis, Tenn., 1,431,000 cu.yd. levee work in Lower and Upper St. Francis and Reelfoot Lake Levee Dist., to Hardwick & Horton, 1302 Sterick Bldg., Memphis, Tenn., $179,735***932,000 cu.yd., to F. M. Crane Co., 210 South 24th St., Omaha, Neb., $133,462***690,000 cu.yd., to M. Mitchell & Son, 323 Saratoga St., New Orleans, La., $107,916***944,000 cu.yd., to R. C. Clark & J. W. Noble, Fayette, Miss., $173,923***800,000 cu.yd., to Driver Co., 62 South Front St., Memphis, Tenn., $139,000. Grand total $734,036. Bids June 12. Noted June 7.

†N. H., Portsmouth—Dpt. Commerce, Lighthouses Service, Portland, Me., furnishing, placing 1,200 tons heavy stone rip rap around base Whaleback Light Station and dogging same. Proposal 1924, to General Lighterage Co., 390 Commercial St., Portland, Me., $3,876 for stone plus $7.25 each for dogs. Awarded June 25. Noted May 24.

†Oregon—U. S. Eng. Portland, drilling about 38 holes for subsurface investigation at and near Bonneville Dam, to R. S. McClintock, Spokane, Wash., $14,116. Bids June 12.

†Pennsylvania—U. S. Eng., Phila., dredging 312,000 cu.yd. from Schuylkill River between Yankee Point and Passyunk Ave., Phila., to American Dredging Co., 308 Chestnut St., Phila., Pa., $97,968. Bids June 12. Noted June 7.

†Virginia and North Carolina—U. S. Eng., Norfolk, Va., dredging in Deep Creek, Va. and Turners Cut, N. C., to W. V. Steen, Dagsboro, Del., $31,886. Bids June 8. Noted May 31.

UNCLASSIFIED

PROPOSED WORK

Calif., Nevada City—SWIMMING POOL—City rejected bids rein.-con. municipal swimming pool. Will readvertise. Noted Apr. 26.

Calif., San Francisco—AIRPORT IMPROVEMENTS—P. Utilities Comn., City Hall, received no bids June 19 for extending landing field in San Francisco Municipal Airport, Contr. 31. To exceed $25,000. Project to be financed by part of $260,000 P.W.A. allotment secured by bond issue of Nov. 7, 1933. Dredging Companies objected to time stipulated in specifications for settlement of ground (6 mos.) declaring it would take at least a year. Bids will be asked again shortly under revised specifications. Noted June 7.

†Calif., San Francisco — TRANSMISSION LINE—Signal Officer, 9th Corps. Area, Presidio, making plans new transmission line in San Francisco Presidia, incl. removal 400 small poles, 13- to 18-in. in length.

Colo., Craig—PIPE LINE—Stanolind Oil Co., 520 West 2nd St., S., Salt Lake City, Utah, plans constructing 61 mi. 4 in. pipe line from Iles oil field to here. $200,000.

N. J., West Orange—MEMORIAL MONUMENT, etc.—International Edison Foundation, c/o J. B. Peterkin & H. A. Kelly, archts., 36 West 44th St., New York, making plans memorial monument and mausoleum (marble obelisk 350 ft. high), Eagle Rock, $2,000,000. Maturity after Jan. 1. C. Keck, 40 West 10th St., New York, sculptor. Plans campaign to finance project.

Pa., Smith's Ferry — RAILWAY — See "Bridges and Grade Crossings."

B. C., Great Central—WHARF—Great Central Saw Mills Ltd. plans constructing wharf at Port Albernia. $100,000.

N. B., St. John—SHEDS—H. C. Schofield, pres., Harbour Comn., bids in August for 700 ft. transit shed on Berth 1, single shed on Berths 2 and 3, 710 ft. long, 420 ft. shed on Berth 4, and extension to transit shed on Berth 14. $2,000,000.

Que., Montreal—RACEWAYS—Montreal Harbour Comrs. bids within 2 months, for reconstruction of 11 raceways at Windmill Point. $339,000.

BIDS ASKED

N. Y., Brooklyn—TRACKS—July 13, by Bd. Transportation, J. H. Delaney chn., 250 Hudson St., New York, installing tracks and contact rail for part of Rapid Transit R.R., Route 107, Sects. 5 and 6; Route 110, Sects. 1 and 2. P.W.A. project.

Tenn., Knoxville—ELECTRIC POWER DISTRIBUTION—July 17, at office W. W. Mynatt, city mgr., Knoxville, complete electric distribution system, Contr. 1, overhead system (Dist. 2), Contr. 2, meters; Contr. 3 transformers; Contr. 4, substation equipment. Burns & McDonnell Eng. Co., 107 West Linwood Blvd., Kansas City, Mo., consult. engrs. Noted Apr. 5.

Ont., Oshawa—LOADING PLATFORM—General Motors Co. of Canada, Ltd., Oshawa, taking bids rein.-con. loading platform, 20,000 sq.ft. of floor space. Private plans. Noted May 10, under "Industrial Buildings."

†C. Z., Coco Solo — PIER — Aug. 8, by Yards & Docks, Navy Dpt., Wash., D. C., earth filled steel sheet pile pier with ducts and service piping, removing existing timber pier at Naval Submarine Base.

CONTRACTS AWARDED

Ga., Rockmart — SWIMMING POOL — See "Waterworks."

Kan., Olathe—SWIMMING POOL, etc.—City, swimming pool and bath house, to Dobson-Humprey Co., Securities Bldg., Omaha, Neb., $21,526. Est. $25,000. P.W.A. E. T. Archer & Co., 609 New England Bldg., Kansas City, Mo., archts. Noted Apr. 26.

Tex., Corpus Christi—SWIMMING BEACH, etc.—C. Raymond, Corpus Christi, swimming beach and resort, incl. new pavilion at water's edge, large bath house, dancing pavilion, water tower, cottages, 10 ft. deep, 25x250 ft. rein.-con. swimming pool, 4 ft. concrete walk and banisters around upper edge, wire netting, screening water of jelly fish, etc. $150,000. Owner builds. Bids soon for most of construction work. Private plans.

MATERIALS AND EQUIPMENT

PROPOSED WORK

FIRE HOSE—**Eureka, Calif.**—City, A. W. Kildale, city clk., plans purchasing 1,000 ft. 2½ in. double cotton jacketed rubber lined fire hose, 50 ft. lengths with couplings.

OIL—**San Leandro, Calif.**—E. F. Hutchings, city clk., received no bids June 18, furnishing and spreading oil on street surfaces for year ending June 30, 1935. Will readvertise.

ABRASIVE MATERIALS—**Chicago, Ill.**—Dpt. P. Wks., rejected bids June 11, 10,000 lb. abrasive materials in 100 lb. bags for approaches to South Halstead St. Bridge over Chicago River. Noted June 7.

ELECTRICAL GENERATORS—**Chicago, Ill.**—Cook Co., County Bldg., plans installing new complete electrical system, or repairing present system if possible of the Cook Co. Court House Building. $150,000. F. H. Chambers, supt. P. Wks.

MASON SAND, etc.—**Chicago, Ill.**—City rejected bids June 14, mason sand, washed gravel and torpedo sand.

PORTLAND CEMENT — **Chicago, Ill.** — City rejected bids June 14, portland cement.

PORTLAND CEMENT—**Jackson, Miss.**—E. D. Kenna, dir. State Hy. Comn., Jackson, rejected bids July 19, 1,000,000 bbl. Portland cement in accordance with State Standard specifications in either sacks or bulk, f.o.b. cars various points within State, beginning Aug. 1, 1934. $2,500,000. May readvertise at later date. P.W.A. project. G. A. Draper, Jackson, engr.

TANKS — **St. Louis, Mo.** — H. S. Dierkes, 1320-24 Cass Ave., granted permit to install 2,000 gal. underground tanks for gasoline in automobile filling station, at 1320-24 Cass Ave.

TANKS—**St. Louis, Mo.**—Industrial Oil Corp., 39th St. and Chouteau Ave., applied for permit to install two 20,000 gal. storage tanks on St. Louis-San Francisco R.R. property, 200 ft. south of Chouteau Ave. and 300 ft. west of 39th St.

TANK—**St. Louis, Mo.**—McGovern Brewery Co., 1435 South Compton Ave., applied for permit to install one 280 gal. underground tank, at 1435 South Compton Ave.

PLACER MACHINE—**White Oaks, N. M.**—El Rico Metals Corp., L. W. Jeffords, pres., plans purchasing modern placer machine from 200-300 cu.yd. capacity for placer ground in Jicarilla Mining Dist.

TANKS—**Jamestown, N. Y.**—Richfield Distributing Co., J. Joy, mgr., Fluvanna Ave., plans installing two 16,000 gal. gasoline storage tanks. $5,000-$6,000.

PIPE—**Casper, Wyo.**—City plans purchasing 3,400 ft. 8 in. and 3,600 ft. 6 in. pipe for irrigation system for Washington Memorial Park.

FIRE FIGHTING APPARATUS—**Grimsby, Ont.**—G. G. Bourne, clk., soon takes bids supply of complete fire fighting apparatus for Town.

BIDS ASKED

ROAD OIL—**Visalia, Calif.**—K. H. Sim, city clk., taking bids 3,000 bbl. or more road oil, asphalt, SC-2.

SIGN BOLTS, etc.—**Indiana**—July 11, by J. D. Adams, chn. State Hy. Comn., Indianapolis, 50,000 sign bolts, f.o.b. Indianapolis; 500 wood sign posts, f.o.b. Petersburg; 2,000 wood guide posts, f.o.b. Dale; 1,500 wood guide posts, f.o.b. Petersburg; 975-1,225 tons 6 and 4 crushed aggregate, f.o.b. Goshen; 2 storage tanks with steam heating coils delivered to Tipton; 700-11,000 tons gravel on Rd. 35.

ROAD OIL—**Columbus, Ind.**—City taking bids road oil.

†*Federal Government.*

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Materials, etc. (Continued)

†**DREDGE PUMP—Louisville, Ky.**—July 24, by U. S. Eng., Post Office Box 59, one 1,600 hp. diesel engine for dredge pump.

ELECTRICAL SUPPLIES, etc.—Boston, Mass.—July 9, by City, A. M. Sullivan, bus. mgr. School Committee, 15 Beacon St., electrical supplies, steel and angle iron, sheet metal supplies, storage batteries, supplies and equipment, rope, lead and smelting supplies, masonry supplies, plumbing equipment and supplies, pipe and pipe fittings, for Boston Public Schools. To exceed $1,000.

†**HELICAL BAR LANTERNS—Detroit, Mich.**—July 13, by Superintendent Lighthouses, 11th Dist., 3760 East Jefferson Ave., 2-10 helican bar lanterns 6 ft. diam.

CASTINGS—New York, N. Y.—July 11, by R. Forbes, comr. Purchase, Municipal Bldg., castings to President, Manhattan Boro.

HOSE, etc.—New York, N. Y.—July 12, by R. Forbes, comr. Purchase, Municipal Bldg., hose and hose fittings to Dpt. Parks, Plant & Structures and President Brooklyn Boro.

PORTLAND CEMENT, etc.—New York, N. Y.—July 9, by R. Forbes, comr. Purchase Municipal Bldg., portland cemnt for Dpt. Correction, Plant & Structures, Water Supply, Gas & Electricity, Brooklyn, Manhattan and Bronx Boros and Police Dpt.; grate bar castings to Dpt. Sanitation.

POWER EQUIPMENT—New York, N. Y.—July 24, by Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., power equipment for Houston-Essex-Rutgers Street Subway. **P.W.A. project.**

RAIL TIES—New York, N. Y.—July 17, by Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., rail ties for subways. **P.W.A. project.**

TRACK MATERIALS—New York, N. Y.—July 20, by Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., track materials for subways. **P.W.A. project.**

†**LAUNDRY EQUIPMENT — Phila., Pa.** — Yards & Docks, Navy Dpt., Wash., D. C., taking bids laundry equipment at Naval Hospital, Spec. 7694. (Date not set.)

†**SLIDE GATES—Knoxville, Tenn.**—July 20, by Tennessee Valley Authority, furnishing, fabricating and delivering 8 sets 5 ft. 8 in. x 10 ft. high pressure slide gates, incl. frames, hoists, automatic and semi-automatic gate hangars, conduit linings, bolts, gaskets, for installation in sluice outlets works at Norris Dam. C. H. Garity, dir. Purchases.

CALCIUM CHLORIDE—Amherstburg, Ont.—Town Council, W. A. McCormick, clk., in market for quantity of calcium chloride.

CONTRACTS AWARDED

CEMENT—Los Angeles, Calif.—Bd. Directors Metropolitan Water Dist., 306 West 3rd St., F. E. Weymouth, engr., 600,000 bbl. portland cement in accordance with Spec. 68, in bulk, f.o.b. cars bidders plant, to California Portland Cement Co., Pacific Mutual Bldg., Monolith Portland Cement Co., 215 West 7th St., Riverside Cement Co., 621 South Hope St., and Southwestern Portland Cement Co., 727 West 7th St., at $1.43 per bbl., total $858,000. Bids June 4, awarded June 22.

CEMENT—Los Angeles, Calif.—Flood Control Dist., 205 South Bway., E. C. Eaton, engr., 4,650 bbl. portland cement to be used in connection with construction Verdugo Wash Conduit between Brand Blvd. and Pacific Ave., Glendale, to Blue Diamond Corp., 1650 South Alameda St., $11,392. Awarded June 18.

ASPHALTIC CONCRETE BASE COURSE, etc.—Oakland, Calif.—J. H. Kimball, secy. East Bay Municipal Utility Dist., 512 16th St., furnishing 1,300 cu.ft. asphaltic concrete base course, 35,000 sq.ft. asphaltic street paving repair surface course, 3,000 sq.ft. asphalt street paving repair skin patching, 700 cu.yd. concrete wet-mix, delivered at trench, exclusive of spreading, to W. H. Larson, 432 Michigan Ave., Berkeley, $15,030. Bids June 13.

ROAD OIL—Oakland, Calif.—City Council, furnishing 1,000 bbl. 50-60 road oil, to Union Oil Co. of California, 220 Bush St., San Francisco, $1.04 per bbl. Bids June 14, awarded June 20.

CAST IRON PIPE—Whittier, Calif.—City, 20,000 ft. Class "B" or Class 150 6 in. c.i. pipe, delivered f.o.b. city yards, to National Cast Iron Pipe Co., 625 South Western Ave., Los Angeles, at 64.5c. per ft. Awarded June 18.

CONDENSER TUBES—Chicago, Ill.—City, 2,500 condenser tubes, to Chase Brass & Copper Co., 1300 West Harrison St., $6,000. Bids May 23, awarded June 23.

FIRE HOSE—Chicago, Ill.—City, 10,000 ft. 2½ in. double jacketed rubber lined hose with 2½ in. so-called Rockerlug couplings attached and threaded "Chicago Standard" with necessary combination spanners, to B. F. Goodrich Co., 310 Taylor St., $8,000; 15,000 ft. 2½ in. double jacketed rubber lined fire hose, to Quaker City Rubber Co., 217 West Monroe St., $12,000. Bids June 5, awarded June 25. Noted May 31.

CRUSHED AGGREGATE—Indiana — State Hy. Comn., Indianapolis, 250 tons crushed aggregate at Hebron, to Monon Crushed Stone Co., Monon, $310. Bids May 18.

CRUSHED AGGREGATE — Indiana—State Hy. Comn., Indianapolis, 2,000 tons crushed aggregate at Kirklin, to Monon Crushed Stone Co., Monon, $2,400. Bids May 31. Noted May 24.

CRUSHED AGGREGATE — Indiana—State Hy. Comn., Indianapolis, 400 tons crushed aggregate at Ogden, to Monon Crushed Stone Co., Monon, $480. Bids May 28. Noted May 24.

CRUSHED AGGREGATE—Indiana—State Hy. Comn., Indianapolis, to Monon Crushed Stone Co., Monon, 200 tons crushed aggregate at Ainsworth $240; 200 tons at Schererville, $240; 200 tons at Keiser $240; 300 tons at Valparaiso, $360. Grand total $1,080. Bids May 28.

CRUSHED AGGREGATE—Indiana—State Hy. Comn., Indianapolis, 3,100 tons crushed aggregate, Woodville, to National Stone Co., Peoria, Ill., $4,340. Bids May 21.

CRUSHED STONE — Boonville, Ind. — City, crushed stone, to F. Austin, Boonville, $865***to Warwick Co. Limestone Co., Boonville, $705***to Bedford-Nugent Co., Bedford, $495. Grand total $2,065. Noted June 21.

CRUSHED STONE—East Chicago, Ind.—City, Z. B. Campbell, supt. Streets, crushed stone, to Moulding Brownell Co., 165 West Wacker Dr., Chicago, Ill., $2,656.

SLAG and TAR—Gary, Ind.—City, R. R. Green, supt. streets, slag, to Illinois Slag & Ballast Co., Gary, $1,246, tar, to Courtright Constr. Co., Gary, $732. Noted Mar. 8.

CRUSHED STONE—Hammond, Ind.—City, G. E. St. John, supt. streets, crushed stone, to Moulding Brownell Co., 165 West Wabash Dr., Chicago, Ill., $1,367.

PRESSURE DISTRIBUTOR, etc.—Iowa—State Hy. Comn., Ames, 400 gal. pressure distributor and 1 tank car material heater, to J. W. Bell Co., Cedar Rapids, $1,832 f.o.b. Minneapolis, Minn., and $3,140 f.o.b. Milwaukee, Wis., respectively. Bids June 19. Noted June 14.

GENERATORS, etc.—Bridgewater, Mass.—Dpt. Correction, Commonwealth of Massachusetts, J. E. Warren, supt. State Farm, two 300 kw. engine driven generators and three 15 kw. exciters, P-15, Docket 4194, to Elliott Co., 1 Federal St., Boston, $39,865. P.W.A. Bids June 15. Noted June 7.

LIQUID ASPHALT—Mt. Clemens, Mich.—Macomb Co. Road Comn., Mt. Clemens, 150,000 gal. liquid asphalt for paving purposes, to Standard Oil Co. of Indiana, 1011 4th St., Detroit, at 47c. per gal. Total $7,050.

PUMP and MOTOR—Litchfield, Minn.—Village, furnishing, installing pump and motor and pumping equipment for new well, to Commonwealth Electric Co., 417 Bway., St. Paul, $2,533. Bids June 11. Noted June 28.

†**CRANE RAILS, etc.—Kansas City, Mo.**—U. S. Eng., Kansas City, crane rails, girders, brackets, clips, bolts for 4 dredges and 4 booster barges, to Treadwell Constr. Co., Midland, Pa., $2,950. Bids June 12.

PIPE—Baraboo, Wis.—City, 2,714 lin.ft. 12- to 36-in. storm sewer pipe, to Illinois-Wisconsin Concrete Pipe Co., 226 North LaSalle St., Chicago, Ill., $3,072. Bids June 9.

†**STEEL PIPE—Milwaukee Wis.**—U. S. Eng., steel pipe, to Crane Co., 225 West Capitol Dr., $3,083. Awarded June 22.

FOREIGN

Australia, Melbourne — July 23, by State Electricity Comn., Victoria, supplying two 2,000 kva. 3 phase, 50 cycle, oil immersed transformers.

England, London—Aug. 6, by Rendel, Palmer & Tritton, engrs., 55 Broctnry, Westminister, S.W., supplying 2 tank locomotives metre gage for Trade Commissioner for Mysore.

England, Rickmansworth — Urban District Council bids in July, 650 houses, $1,300,000. Private plans.

Japan, Hiroshima—Japan Iodine Co., Yokohama, nickel and chemical works, by separate contracts. To exceed $300,000.

Manchukuo, Hsinking — Manchuko Empire plans sewerage system. $400,000 appropriated. **Maturity at once.**

Northern Ireland—H. M. Rollock, minister of Finance plans housing. $10,705,000 available.

South Africa, Pretoria—Ministry of Finance making plans irrigation works, incl. dam at Loskop. $4,945,000.

Turkey, Istanbul—City Authorities making plans tunnel under the Bosphorus linking Europe and Asia, from Arnoutkenny on European side to Vanikenny on Asiatic side.

Union Socialist Soviet Republics—Commissariat of Heavy Industry, Soviet Government, Moscow, or c/o Amtorg Trading Corp., 261 5th Ave., New York, additional units to Ural Heavy Machinery Plant, day labor. To exceed $1,000,000.

Union Soviet Socialist Republics — Soviet Govt., Moscow, or c/o Amtorg Trading Corp., 261 5th Ave., New York, network of road and highway construction 210,000 kilometers, by day labor.

U.S.S.R., Onega—Soviet Government, Moscow, or c/o Amtorg Trading Corp., 261 5th Ave., New York, wood pulp plant, by day labor. $1,000,000 or more with equipment.

U. S. S. R., Yaroslavl—Automobile Trust Soviet Government, Moscow, or c/o Amtorg Trading Corp., 261 5th Ave., truck manufacturing plant addition, day labor. To exceed $5,000,000.

Venezuela, Aruba Island—Standard Oil Co. of New Jersey, 26 Bway., New York, refinery tower and tanks, incl. 7,550 tons steel, to Chicago Bridge & Iron Co., Chicago, Ill., and 30 Church St., New York. To exceed $28,000. Noted June 21.

PUBLIC BUILDINGS

PROPOSED WORK

N. Y., Olean—Bd. Educ. voted $815,000 for Senior High School. P.W.A. project. Noted June 21.

Man., Winnipeg—Administrative Bd. of Red Deer Hospital takes bids in July for addition to hospital. $150,000.

BIDS ASKED

Calif., Visalia—July 12, by Clerk Tulare Co., 4 story, rein.-con. courthouse addition. $140,000. E. J. Kump, Rowell Bldg., Fresno, archt. Noted June 7.

Ga., Atlanta—July 27, by Bd. Comrs., Fulton Co., Court House, remodeling 4 story, basement, jail. $155,000. Hentz, Adler & Schutze, Candler Bldg., archts. P.W.A. project. Noted Apr. 5.

†**Ind., Lawrenceburg** — July 18, by Treas. Dpt. at office Sup. Archt., Wash., D. C., post office. Noted Dec. 21.

†**Ky., Mayfield**—July 17, by Treas. Dpt. at office Sup. Arch., Wash., D. C., extending and remodeling U. S. Post Office. Noted Mar. 29.

†**Mass., Boston**—July 12, by Treas. Dpt. at office Sup. Arch., Wash., D. C., medical officers double house and garage at U. S. Marine Hospital.

†**Mass., Cambridge**—July 10, by Treas. Dpt. at office Sup. Arch., Wash., D. C., installing 2 freight elevators at U. S. Post Office. Noted Aug. 17.

Mass., Tewksbury—July 10, by Commonwealth of Massachusetts, Dpt. P. Welfare, Trustees, State Infirmary, 2 story, basement, irregular sized, brick storehouse, concrete found., at State Infirmary. $149,000 loan and grant. H. I. Rourke, 45 Merrimack St., Lowell, archt.

†**N. Y., Potsdam**—July 13, by Treas. Dpt. at office Sup. Archt., Wash., D. C., miscellaneous changes in U. S. Post Office.

†**N. C., North Wilkesboro** — July 17, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. Noted June 7.

†**Tex., Sequin**—July 24, by Treas. Dpt. at office Sup. Arch., Wash., D. C., U. S. Post Office. Noted June 7.

†**Wash., Almira**—July 23, by Bureau Reclamation, constructing fourteen 3-room, and sixteen 4-room residences at government camp at Grand Coulee Dam, Columbia Basin Project, about 22 mi. northwest of here. M. A. Schurr, acting comr.

N. B., Moncton—July 26, by Secretary Dpt. P. Wks., Ottawa, Ont., 2 story, basement, 190x 210 ft., brick, steel public building, plain found. $630,000. T. W. Fuller, Dpt. P. Wks., Ottawa, Ont., archt.

Ont., Fort William—July 24, by Secretary Dpt. P. Wks., Ottawa, 3 story, basement 86x141 ft., brick, steel public building, plain found. $425,000. T. M. Fuller, Dpt. P. Wks., Ottawa, archt.

Ont., London—July 16, by Secretary Dpt. P. Wks., Ottawa, supply and installation of 250 hp. steam boiler and automatic stoker required for Westminster Hospital. $17,000. T. W. Fuller, Ottawa, archt.

CONTRACTS AWARDED

†**Ala., Montgomery** — Con. Q.M., Maxwell Field, constructing film vault for Squadron Officers School, to A. Blair, 1st Natl. Bank Bldg., $8,146. Bids June 20.

†**D. C., Wash.**—Treas. Dpt. at office Sup. Arch., Wash., D. C., air conditioning radio test room, Bellevue, Spec. 7675, to York Ice Mchy. Corp., 1238 North 44th St., Phila., Pa., $23,368. Bids June 26. Noted June 21.

†**D. C., Wash.**—Treas. Dpt. at office Sup. Archt., Wash., D. C., completing central heating plant, to S. E. Dockstader, 305 Munsey Bldg., $31,850. Bids June 6. Noted May 24.

Ill., Chicago—Bd. Educ., 228 North LaSalle St., furnishing, installing new Kewanee fire box boilers in Park Manor Schools, 7049 Rhodes Ave., to Robert Gordon, Inc., 22 West Adams St., $17,450***in Kohn School, 10454 South State St., to A. F. Walsh, 7536 South Shore Dr., $18,158***in Cookery School, 2510 South Kildare Ave., to Hanley & Co., 1503 South

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†*Federal Government.*

Public Buildings (Continued)

Michigan Ave., $17,177***in Agazzie School, 2851 North Seminary Ave., to C. W. Johnson, Inc., 211 North Desplaines St., $18,192***in Haugen School, 4540 North Hamlin St., to A. Kilander & Co., 126 South Clinton St., $19,460 ***furnishing, delivering Kewanee fire box boiler for Parkman School, 245 West 51st St., to Gallaher & Speck, 215 West Congress St., $18,208. Grand total $108,645. Bids May 22, awarded June 18.

Ind., Aurora—School Comrs., general contract high school, to E. A. Carson, 1165 East 30th St., Indianapolis. Est. $110,000. **P.W.A.** Bids June 7. Noted May 24.

Ind., Lowell — School Comrs., new steam heating plant, plumbing and electrical work, to W. Tatman, Lowell, $18,159. Est. $25,000. Bids June 11. Noted June 7.

Ia., Sumner—Town, new city light plant, to Fairbanks-Morse Co., 900 South Wabash Ave., Chicago, Ill., $106,000.

Ia., Villisca — City, constructing municipal light and power plant, equipment and distribution system. Contrs. 1 and 2, to Electric Equipment Co., 207-09 Grand Ave., Des Moines, $148,850. **P.W.A.** Bids May 15. Noted Jan. 18.

Kan., McPherson—City Clerk, municipal light and power plant and distribution, incl. one 5,000 g.p.m. unit, to Marley Co., 1737 Walnut St., Kansas City, Mo., $16,900, less deduction of $300, for furnishing 12-blade instead of 6-blade fans and $610 deduction for furnishing wire fence on one side of tower instead of 4 sides***furnishing one 3,000 kw. (3,750 kva) steam turbine generator unit, to Elliott Co., Fairfax Bldg., Kansas City, Mo., $67,400 ***one 5,000 sq.ft. surface condenser and auxiliaries, to Westinghouse Electric & Mfg. Co., Wichita, $16,580, less deduction of $652 for omitting rect. exp. joint and plus $319, for 42 in. copper expansion joints. **P.W.A.** Noted May 31.

Mass., Amherst—Commonwealth of Massachusetts, F. C. Kenney, treas., State College, renovating and improving steam system, at Mass State College, to Hugh Nawn, Inc., 77 Floydell St., Brookline, $67,061; furnishing, erecting steam turbo-generator and wing, to Allis Chalmers Mfg. Co., 50 Congress St., Boston, $19,243. **P.W.A.** Bids June 15.

†Mass., Northampton — Vet. Bu., Arlington Bldg., Wash., D. C., furnishing incinerator for rubbish at U. S. Veterans Administration Building, to T. G. Egan Refractory Eng. Co., Inc., 70 Kane St., Brooklyn, N. Y., $5,500. Bids June 5 awarded June 19. Noted May 24.

Mo., Butler — Consolidated School Dist. 4, c/o Bd. Educ., G. L. Thomas, pres., constructing, completing 2 story, 60x90 ft., brick school, plumbing, heating, electrical work, fixtures, etc., to Groeschel Co., Marshall, $3,980. **P.W.A.** H. D. Pampel Finance Bldg., Kansas City, engr. Bids June 12. Noted Jan. 12, 1933.

N. Y., Ausable Forks—Bd. Educ., heating for school, to F. Bradt Co., Inc., 133-17 Oakwood Ave., Syracuse, $33,136; electrical work, to L. W. Kiesewetter, 618 North Saline St., Syracuse, $8,700. **P.W.A.** Bids Apr. 17. Noted Apr. 12.

N. Y., Broadalbin—Bd. Educ., heating and ventilating for school, to D. A. Bonnett, Delmar, $22,140; plumbing, to J. E. Harbison, 213 Union St., Schenectady, $5,743. **P.W.A.** Bids Apr. 3. Noted May 24, under "Contracts Awarded."

†N. Y., Brooklyn—Yards & Docks, Navy Dpt., Wash., D. C., roofing repairs on Building 4, at U. S. Naval Hospital, to Nassau Roofing & Sheet Metal Co., 298 Jericho Turnpike, Floral Park, N. Y., $2,914.

N. Y., Dobbs Ferry—Bd. Educ., electrical work for school, to Carroll-Ratner Corp., 477 Main St., New Rochelle, $38,734; plumbing, to Hauxwell & Smith, Inc., 46 Broad St., Port Chester, $32,804. **P.W.A.** Bids Apr. 13. Noted June 21, under "Contracts Awarded."

N. Y., Mattituck—Bd. Educ., plumbing for school, to J. E. Kahn, 224 West 20th St., New York, $14,643***electrical work, to Meeker Electric Co., Inc., 25 Capitol Ave., Willis Park, $11,675***sewage disposal, to Suffolk Septic Tank Systems, Inc., Water Mill, $1,517***heating and ventilating, to D. J. Rice, Inc., 4150 38th St., Long Island City, $32,870. Grand total $60,705. **P.W.A.** Bids May 4. Noted May 31, under "Contracts Awarded."

†N. Y., Monticello — Treas. Dpt. at office Sup. Archt., Wash., D. C., U. S. Post Office, to Carrado Co., Inc., 62 8th Ave., Newark, N. J., $46,460. Bids June 8. Noted May 31.

N. Y., Newark—Commissioner Dpt. Hygiene, State Office Bldg., heating at Newark State Hospital, to F. Bradt Co., Inc., 113-17 Oakwood Ave., Syracuse, $76,940; electrical work, to J. E. Stewart, 145 Shelter St., Rochester, $28,600. **P.W.A.** Bids Apr. 18. Noted Mar. 22.

N. Y., Wolcott—Benz Eng. Co., general contractors, Salamanca, structural steel for Leavenworth School, to Smith & Caffrey Co., Lodi St., Syracuse, for Bd. Educ. Noted June 28, under "Contracts Awarded."

†O., Toledo—Treas. Dpt. at office Sup. Archt., Wash., D. C., repairing and renovating U. S. Custom House and Court House, to J. H. Barkebile & Sons, 998 Whittier St., $8,406. Bids June 19. Noted June 7.

†Pa., Aspinwall—Vet. Bu., Arlington Bldg., Wash., D. C., boilers, stokers and boiler plant, to T. G. Egan Refractory Eng. Co., 70 Kane St., Brooklyn, N. Y., $43,981.

Utah, Logan—State Building Comn., Salt Lake City, general contract Home Economics Building at Agricultural College, to Jacobsen Constr. Co., 724 South 3rd St. E., Salt Lake City, $182,400***plumbing and heating, to R. D. Evans, Ness Bldg., Salt Lake City, $31,326 ***electrical work, to Cache Valley Electrical Co., Logan, $20,483. Grand total $234,209. **P.W.A.** Bids June 22, awarded June 24. Noted June 7.

Ont., Toronto—Electric Power Comn. of Ontario, 190 University Ave., cut stone for 18 story addition to F. P. Hydro-Electric building addition, to Geo. Oakley & Sons Ltd., 357 Lagan Ave. Awarded June 16. Noted June 7.

COMMERCIAL BUILDINGS

PROPOSED WORK

Mass., Belmont—First Baptist Church, F. E. Heath, pastor, 24 Harding Ave., soon lets contract 2 story, basement, 40x95 ft. and 35x80 ft. brick, stone, stucco church and parish house, Burnham and Lexington Sts. $105,000. A. A. Dirlam, 142 Pleasant St., Malden, archt. Noted May 24.

N. Y., Brooklyn—Lincoln Savings Bank, 531 Bway., Brooklyn, soon takes bids general contract bank, 5th Ave. and Bay Ridge Parkway. $200,000. Koch & Wagner, 32 Court St., archts.

N. Y., New York—Society of Lying in Hospital, 525 East 68th St., indefinitely postponed taking bids altering hospital into apartments, 307 2nd Ave. $650,000. A. Weiser, 120 East 41st St., archt. May abandon project. Noted Mar. 22.

O., Cleveland—Walker & Weeks, archts., 2341 Carnegie Ave., soon lets contract general interior alterations, structural steel, masonry, etc., in 6 story, basement department store, 630 Euclid Ave., for Wm. Taylor & Son Co., Major C. H. Strong, genl. mgr., 630 Euclid Ave. Est. $500,000. Clark, MacMullen & Riley, 2341 Carnegie Ave., mechanical engrs. Elevators, to Otis Elevator Co., 1373 East 6th St.; enclosures, to W. S. Tyler Co., 3615 Superior St.; marble, to Haworth Marble Co., Union Trust Bldg.

Wis., Wausau—St. Marys Catholic Congregation, J. B. Hauck, pastor soon lets general contract 2 story, basement, 80x80 ft., brick, steel parochial school, plain found. G. A. Krasin, 202½ South Central Ave., Marshfield, archt.

BIDS ASKED

Ind., Valparaiso—See "Contracts Awarded."

N. J., Tenafly—See "Contracts Awarded."

CONTRACTS AWARDED

Ind., Valparaiso—Seven Dolores Shrine, constructing monastery, 9 mi. northwest of here, separate contracts and day labor. $200,000. Private plans.

Ia., Sioux City—Montgomery Ward & Co., W. H. Caulley, in charge, 619 West Chicago Ave., Chicago, Ill., general contract 3 story, mezzanine, basement, 75x150 ft. department store, 143 Pierce St., to Kucharo & Sugurman Constr. Co., 404 Hubbel Bldg., Des Moines*** marble and tile, to McNeil & Son., 310 Jackson Blvd., Chicago, Ill***millwork, to Jaeger Mfg. Co., 100 South West 8th St., Des Moines*** steel columns, to Crex Patent Col. Co., 2300 South Springfield Ave., Chicago, Ill. Est. $130,000. Noted May 3.

Mass., Malden—Allen, Collens & Willis, archts., 75 Newbury St., Boston, general contract 1½ story, basement, 65x110 ft. and 16x40 ft. church, Pleasant St., for First Congregational Church, 112 Dexter St., to C. S. Patten, 638 Main St., Melrose; electrical work to M. B. Foster Electric Co., 514 Atlantic Ave., Boston. Est. $150,000. Awarded June 25. Noted May 17.

N. J., Tenafly—Home & Community Builders, Inc., East Clinton St., and DePeyster Ave., group of dwellings, East Clinton St. and De Peyster Ave., separate contracts. To exceed $150,000. J. N. Hunter, c/o owner, archt. Noted June 14.

N. Y., Lido Beach (Long Beach P. O.) — B. Gertson, Lido Blvd. and Ocean, constructing group dwellings at Lido Blvd. and ocean, to Gertson Constr. Co., Lido Blvd. To exceed $100,000. Contractors will do work by separate contracts and day labor.

O., Cleveland—See "Proposed Work."

Tex., Galveston—Hutchins-Sealy Natl. Bank, c/o J. W. McCullough, vice-pres., 2209 D St., plumbing and heating for 1 story 37 x 120 ft. bank, to S. Schlankey, 2201 Avenue B., $6,239; electric wiring, to M. Levy Electric Co., 2209 Avenue C., $1,800. Noted June 21 under "Contracts Awarded."

INDUSTRIAL BUILDINGS

PROPOSED WORK

Conn., Willimantic — LAUNDRY — Maverick Laundry, 828 Main St., temporarily postponed construction 1 story, 75x120 ft. brick, concrete modern laundry unit. $50,000. Bowden & Russell, 13 East 37th St., New York, archts. Noted Mar. 29.

Me., Lewiston—WAREHOUSE, etc.—Lamey Wellehan, 110 Lisbon St., soon takes bids rebuilding 2 story, basement, 25x90 ft., brick, concrete, steel warehouse and store, Lisbon St. $28,500 or more. Coombs & Harriman, 11 Lisbon St., Lewiston, archts.

Md., Carrollton—DISTILLERY—C. J. Kiefer, engr. and archt., 918 Schmidt Bldg., Cincinnati, O., soon lets contract distillery buildings, incl. fermenting building and mash house, cistern building and boiler house, warehouse, cooperage building and office building, for Trimble Distilling Co., Carrollton. $200,000.

Mass., Dorchester—PLANT—Neponset Tanning Co., 68 Devonshire St., Boston, plans by T. B. Hamilton, 421 Marlboro St., Boston, 2 story, 65 x 160 ft. rein.-con. tanning plant, Tenean St. $90,000.

Mich., Monroe—MILL—Wolverine Lumber & Supply Co. plans rebuilding woodworking mill, destroyed by fire. $50,000 or more. **Maturity indefinite.** Architect not appointed.

Mich., Wyandotte—PLANT—Michigan Alkali Co., Wyandotte, plans rein.-con. brick, steel, stone chemical plant, plain found. $1,000,000. Private plans.

BIDS ASKED

Mich., Detroit—BREWERY—G. A. Mueller, archt., 1001 American Radiator Bldg., Broadway Ave., taking bids rebuilding 2 story, basement, brick, steel concrete bakery and converting it into a unit of brewery plant, Ten Mile Rd., in vicinity of here, for Voigt Brewing Co., c/o Architect. $100,000.

N. Y., Jamaica—SERVICE BUILDING and INSPECTION SHED—July 20, by Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., New York, service building and inspection shed, at Jamaica Yards.

N. Y., New York—GARAGE—See "Contracts Awarded."

Tex., Corpus Christi—GASOLINE REFINERY—See "Contracts Awarded."

Alaska—GOLD MINING DEVELOPMENT—See "Contracts Awarded."

Que., Boischatel—MILL—Arntfield Gold Mines Ltd., D. Boydell, engr., Toronto, Ont., in market for 1,000 ton mill, first unit to be 250 tons a day capacity here.

CONTRACTS AWARDED

Calif., Los Angeles—CREAMERY—Knudsen Creamery Co., 1957 Santee St., general contract 2 story, and 1 story, creamery building group, to H. Hansen, 1185 North Flores St. Est. $50,000. Owner will take bids later for roofing, plumbing, electrical work, etc. Noted June 21.

La., Baton Rouge—ALKALI MILL—Solvay Process Co., Solvay, N. Y., over 4,000 tons structural steel for alkali plant, Mississippi River, to R. C. Mahon Co., 8650 Mt. Elliott St., Detroit, Mich. Noted June 21.

Mich., Detroit—STEEL PLANT—Rotary Electric Steel Co., Eight Mile Rd. and Mound Ave., 1 and 2 story, 300x750 ft., structural steel frame for steel, concrete building addition Mound Ave. and Eight Mile Rd., to R. C. Mahon Co., 8650 Mt. Elliott Ave. Est. $300,000. Private plans.

Miss., Jackson—PLANT—Hull & Drummond, archts., Jackson, 1 story, 165 x 300 ft. main fertilizer building, to W. J. McGee & Son, Jackson, for Jackson Fertilizer Co., Jackson. Bids June 7, awarded June 15. Noted Jan. 11.

N. Y., New York—Steiner Kopperl Realty Co., 713 Amsterdam Ave., altering, heating and plumbing for apartments, 713 Amsterdam Ave., to MacArthur Constr. Co., 101 Park Ave., New York. Est. about $28,000.

N. Y., New York—GARAGE, etc.—Texas Co., lessee, 135 East 42nd St., 2 story garage, repair and service station, 110th St. and 5th Ave., separate contracts. $50,000 with equipment. E. DeRosa, 105 East 40th St., consult. archt.

S. D., Watertown—PLANT—Swift & Co., U. S. Yards, Chicago, Ill., general contract 3 story, 60x65 ft., beef killing plant, to Campell, Louorie & Lautermilch, 400 West Madison St., Chicago, Ill. Est. $50,000. Awarded about June 15. Private plans.

Tex., Corpus Christi—GASOLINE REFINERY—Corpus Christi Refining Co., 1st unit refinery, day labor. $75,000. Work started. Will start upon 2nd and 3rd units as soon as 1st unit is completed. Total est. $300,000. Private plans. Noted May 24.

Wis., Menasha — FACTORY — Menasha Products Co., 2 story, 40x160 ft., brick, steel, rein.-con., factory, plain found. to C. R. Meyer & Sons Co., 50 State St., Oshkosh. Awarded June 18.

Alaska—GOLD MINING DEVELOPMENT—Chicagof King Mining Co., Tacoma, Wash., and c/o H. B. Miller, treas., gold mining development, Chicagof Island, Sitka Mining Dist., day labor. To exceed $100,000.

Ont., Sudbury—MILL—Lebel Ore Gold Mines Ltd., 702 Northern Ontario Bldg., Toronto, L. Dougan, engr., 200 ton per day flotation and cyanidation mill, about 8 mi. from here, to Shoemaker & Burnham, c/o owner.

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†Federal Government.